RECORD OF DECISION

FINDETT OPERABLE UNIT 4

HUSTER ROAD SUBSTATION

ST. CHARLES, MISSOURI

Prepared by:

U. S. Environmental Protection Agency
Region 7
11201 Renner Blvd
Lenexa, Kansas 66219

June 30, 2021

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APPENDICES

LIST OF ACRONYMS

AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	contaminants of concern
COPCs	contaminants of potential concern
CSM	conceptual site model
DCE	dichloroethylene
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
ft	foot
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
ICs	Institutional controls
IRIS	Integrated Risk Information System
MCL	maximum contaminant level
mg/kg	milligram per kilogram
MoDNR	Missouri Department of Natural Resources
MRL	minimum risk levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
PCE	tetrachloroethylene
PRP	Potentially Responsible Party
RAOs	Remedial Action Objectives
RAR	Removal Assessment Report
RD	Remedial Design
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SF	slope factor
SLERA	Screening Level Ecological Risk Assessment
TCE	trichloroethylene
µg/L	micrograms per liter
VC	vinyl chloride
yd^3	cubic yards
ZVI	Zero Valent Iron

PART 1: DECLARATION

1.0 Site Name and Location

Site Name:	Findett Corporation/Hayford Bridge Road
Operable Unit:	4, Huster Road Substation
Site Location:	St. Charles, Missouri
Lead Agency:	U.S. Environmental Protection Agency
Support Agency:	Missouri Department of Natural Resources
Site Identification Number:	MOD006333975

2.0 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the Ameren Missouri Huster Road Substation (Operable Unit 4 (OU4)) of the Findett Corporation/Hayford Bridge Road Site (Site) in St. Charles, Missouri (Appendix B, Figure 1). The decision represented in this document was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended, 42 U.S.C. § 9601 *et seq.*, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 C.F.R. part 300.

This decision is based on the Administrative Record (AR) for the Site, which has been developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k). This AR file is available for review online at https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0700845, and at the U.S. Environmental Protection Agency Region 7 Records Center, 11201 Renner Boulevard, Lenexa, Kansas 66219.

The state of Missouri (state), through the Missouri Department of Natural Resources (MoDNR), concurs with the Selected Remedy. MoDNR's concurrence with the preferred remedial alternative as set forth in the Proposed Plan, and chosen as the Selected Remedy in this ROD is included in Appendix D.

3.0 Assessment of the Site

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

4.0 Description of the Selected Remedy

OU4 addresses groundwater contaminated with volatile organic chemicals (VOCs) at the Ameren Missouri Huster Road Substation (Substation). The Selected Remedy is Enhanced In-Situ Bioaugmentation Attenuation (Enhanced Bio) and Groundwater Extraction and Treatment System (GETS), as needed; and Institutional Controls (ICs).

Most of the elements of the Selected Remedy were started as part of four pilot studies conducted between 2014 and 2018. The work performed during the pilot studies has reduced the size of the groundwater plume to a small area within the Substation. All groundwater north of the Substation is below the Safe Drinking Water Act maximum contaminant levels (MCLs) for all Site contaminants of concern (COCs). For soil, although subsurface concentrations of some COCs at the Substation were elevated prior to the pilot studies, none of the concentrations detected after completion of the pilot

studies pose unacceptable human health risks when compared to the EPA's risk-based Regional Screening Levels (RSLs) for a residential exposure scenario.

The Selected Remedy includes the following:

- Naturally occuring *Dehalococcoides,* an anerobic bacteria capable of reductive dechlorination, along with nutrients to support the bacteria (enhanced bioaugmentation), have been injected downgradient from the Substation's transformer number 2 (Transformer 2), creating an attenuation zone that reduces COCs as groundwater passes through the zone.
- The existing GETS, in operation since 2014, can be placed in stand-by status to allow the enhanced bioaugmentation to continue to reduce the contaminant plume. While in standby status, inspection and maintenance of the GETS may be necessary to keep the system operational.
- Ongoing monitoring will be performed to confirm ongoing degradation and evaluate the need for additional bioaugmentation. Wells demonstrating compliance with the MCLs for an extended period and no longer needed for monitoring will be removed from monitoring and abandoned in accordance with state requirements. The specific wells designated for this purpose will be identified in a groundwater monitoring plan.
- A remedial action of restarting the GETS or additional enhanced bioaugmentation, or a combination of the two, must be implemented if the MCL is exceeded for one event for any COC found in groundwater outside the Substation or there is an increasing Mann-Kendall[1] trend of any COC in groundwater inside the Substation for four consecutive quarters. The GETS and/or enhanced bioaugmentation would continue to be implemented until the groundwater COCs show a declining Mann-Kendall trend for four consecutive quarters.
- ICs in the form of an environmental covenant, or other equivalent proprietary control, will be executed and filed with the Recorder of Deeds Office, prohibiting the installation of potable water wells within or near the contaminant plume and construction of buildings within the Substation without prior notification of and approval by the EPA and the state.
- Engineering controls such as site or area berms and fencing to control exposure pathways will be implemented as needed. To ensure that public access to OU4 remains restricted, security measures will continue to be taken and documented at OU4, including fencing, locked gates, and restricted access to approved personnel.

Current estimates indicate that cleanup levels will be attained throughout the contaminated portion of the aquifer within a reasonable time frame of less than ten years. The total present worth cost for the Selected Remedy is $265,000. (See table below.)

Bio per Application	$35,000
GETS Annual O&M Cost	$130,000
Annual Groundwater Monitoring	$100,000
Annual Present Worth Cost	$265,000
Time to Meet RAOs	<10 years

Actions performed under multiple Orders on Consent and pilot studies voluntarily performed by the sole potentially responsible party (PRP), Ameren Missouri (Ameren), have resulted in attaining the remedial action objectives (RAOs) for groundwater north of the Substation and have made significant progress toward those goals within the Substation. RAOs for soil are not required because contaminant levels

[1] The Mann-Kendall Trend Test is used to analyze data collected over time for consistently increasing or decreasing trends.

have been reduced through the pilot studies to concentrations that no longer pose an unacceptable risk to human health or the environment.

RAOs developed for contaminated groundwater for human health protection include:

- Prevent exposure to COCs above their MCLs in groundwater;
- Prevent potential future risks to human receptors from inhalation of groundwater COCs via the vapor intrusion pathway;
- Prevent future migration of groundwater contamination off-site; and
- Restore groundwater to beneficial use (i.e., at or below MCLs) within a reasonable timeframe.

The Selected Remedy will: (1) be protective of human health and the environment; (2) comply with Applicable or Relevant and Appropriate Requirements (ARARs); (3) be cost effective; and (4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

5.0 Declaration of Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

The Selected Remedy also satisfies the statutory preference for treatment of principal threats as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants as a principal element through treatment). Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

6.0 ROD Data Certification Checklist

The following information is included in the Decision Summary section of this ROD (Part II). Additional information can be found in the AR file for this Site.

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7.0 Authorizing Signature

This ROD documents the Selected Remedy for OU4 of the Findett Corporation/Hayford Bridge Road Superfund Site. This remedy was selected by the EPA with the support of MoDNR. The Director of the Superfund and Emergency Management Division for the EPA, Region 7 has been delegated the authority to approve and sign this ROD.

MARY PETERSON Digitally signed by MARY PETERSON Date: 2021.06.30 08:12:51 -05'00'

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Mary P. Peterson, Director
Superfund & Emergency Management Division

PART II: DECISION SUMMARY

8.0 Site Name, Location and Description

The Site is divided into four operable units (OUs): OU1 addresses the soil and groundwater contamination on the property owned by Findett Real Estate Corporation (Findett);[2] OU2 addresses the soil contamination on the property formerly owned by Cadmus Corporation (Cadmus), now owned by Findett; OU3 addresses affected groundwater that has migrated off site of the OU1/OU2 property boundaries; and OU4 is a separate and distinct contaminated soil source area and groundwater plume under the Substation.

The Substation, OU4, of the Site, is located at 3800 Huster Road, St. Charles, Missouri 63301. It is an active electrical distribution and transmission substation. The Substation was originally constructed in 1963 and, with subsequent expansions, now encompasses approximately 8 acres. The Substation property contains a control house, three transformers, two capacitor banks, and associated equipment, including a copper grounding grid embedded within crushed limestone. The Substation is situated within the Missouri River alluvial valley and is adjacent to the City of St. Charles (City) Elm Point Wellfield, specifically City Wells 4 and 5. City Wells 6, 7, and a radial well, City Well 9, are located north of the Substation. The newly-installed City Well 10 is east of the Substation. (See Appendix B, Figure 2.)

The EPA is the lead Agency for the Site, and MoDNR is the support Agency. Ameren is the sole PRP for OU4 and is performing and funding its cleanup.

9.0 Site History and Enforcement Activities

The Site originally came to the EPA's attention in the late 1970s when Findett reported handling polychlorinated biphenyls (PCBs). During an EPA inspection, an unlined "quench pond" was identified on the boundary between the properties owned by Findett and an affiliated company, Cadmus. Findett used the quench pond for release of hot residues from its recycling processes. In 1977 and 1981, Findett excavated the pond and disposed of the contaminated soils off-site. The PCB contamination in the surface soils was the primary concern in those early years of activity at the Site. Subsequent investigations identified that VOC contamination existed in the subsurface soils and groundwater.

OU1

In 1984, the EPA proposed the Site for inclusion on the National Priorities List (NPL) of hazardous waste sites, mainly due to the potential exposure to contaminated groundwater of the nearby Elm Point Wellfield, which is a drinking water source for the City. The proposal was later withdrawn due to potential overlapping jurisdiction with the EPA's Resource Conservation and Recovery Act. However, a ROD and corresponding Consent Decree with Findett were in place before the withdrawal. As a result, the EPA has continued to manage the Site as an "NPL-caliber" site using Superfund authority. Management of an NPL-caliber site follows the same Superfund process as a site on the NPL, without the access to federal funding.

The OU1 ROD, signed on December 28, 1988, did not explicitly define RAOs. However, the ROD indicated that the goal of the remedy was to contain OU1 contamination in the shallow aquifer.

[2] Findett Corporation has changed names a number of times throughout the years. In the 1960s, it was incorporated in Missouri as Findett Services Corporation, it later changed its name to Findett Corporation, and currently exists as Findett Real Estate Corporation. For ease of reference, the term “Findett” collectively refers to the Findett entities.

The selected remedial actions included:

- Hydraulic control of the shallow contaminated plume using groundwater extraction wells screened in the upper granular unit;
- Groundwater treatment using air stripping to remove organic contaminants, with an option for further treatment of groundwater using Granular Activated Carbon (GAC);
- Discharge of treated groundwater to the sewage treatment plant; and
- Off-site disposal and treatment of contaminated surface and near-surface soil excavated around the Findett Quench Pond.

By October 1991, the EPA and the City approved the construction and operation of the GETS. That remedial action is presently ongoing.

A ROD Amendment for OU1 was signed on September 25, 1995, to address the soils, which allowed for bio-remediation of PCBs, but if the performance standards were not achieved on schedule, then the original excavation and off-site disposal remedy would be implemented. Eventually Findett proposed ending the biotreatment effort and conducted the excavation and off-site disposal of the PCBs based upon logistical and schedule issues for Findett, rather than upon the results of the biotreatment process. The EPA and MoDNR approved the corresponding work plans, resulting in completion of the soils remedial action in April 2003.

OU2

In 1995, the EPA completed an evaluation of the Cadmus property, designated as OU2, which resulted in an Engineering Evaluation/Cost Analysis (EE/CA) to address the PCB-contaminated soil at the Site. The OU2 Removal Action Memo, signed on November 7, 1995, does not explicitly define RAOs. However, the proposed removal action included excavation and offsite disposal of all soils contaminated with PCBs above 25 parts per million (ppm) and located above the water table at the Cadmus property.

Soil removal was completed on April 18, 2003. No PCBs remain at the Site above the 25 ppm level.

OU3

Contaminants, including benzene, vinyl chloride (VC), *cis*-1,2-dichloroethylene *(cis*-1,2-DCE) (commonly known as 1,2-dicholoroethylene), and chloroethane, were found in monitoring wells above MCLs located just north of the Findett property and migrating towards the Elm Point Wellfield, which serves as the source of drinking water for the City. This groundwater plume was identified and addressed as OU3. The OU3 ROD was signed on September 28, 2005. The RAO for the OU was to protect human health by eliminating exposure to groundwater contaminated above regulatory standards or risk-based standards for site-related contaminants.

On July 3, 2007, the court entered a Consent Decree requiring the Hayford Bridge Road responsible parties (Findett Real Estate Corporation, The Goodyear Tire & Rubber Company, General Motors Corporation, ACF LLC, Mallinckrodt Inc., and Pharmacia Corporation, collectively "OU3 RPs") to implement the Monitored Natural Attenuation remedy, consistent with the 2005 ROD. The design was completed in April 2008, and the construction of the monitoring well network was completed during the summer of 2008. The Remedial Design/ Remedial Action Construction Completion Report was submitted in December 2008, which the EPA conditionally approved in May 2009. The city ordinance

to implement the required groundwater ICs was approved in February 2010.

OU4

In June 2010, *cis*-1,2-DCE was detected in City Well 5 of the Elm Point Wellfield, located approximately 180-200 feet north of the Substation boundary. Between 2011 and 2015, a group of PRPs performed additional investigations and response actions to address this contamination. Based on the analytical data collected by the PRPs in 2011, as well as independent testing by Ameren in 2012, the EPA identified OU4 as a separate and distinct source of contamination contributing significantly to the contamination in the Elm Point Wellfield. Ameren previously used a chlorinated solvent for degreasing and metal cleaning at the Substation. The solvent was manufactured by Mozel Chemical Company and contained approximately 18% tetrachloroethylene (PCE) and mineral spirits. The EPA determined that Ameren was the sole PRP responsible for OU4's contamination.

On December 28, 2012, the EPA and Ameren entered into a Settlement Agreement and Administrative Order on Consent (2012 AOC) to:

- Perform soil and groundwater sampling at the Substation to determine to what extent the Substation property is a source of contamination contributing to the existing OU3 groundwater plume;
- Contain and treat contaminated groundwater migrating off the Substation property; and
- Evaluate future remedial and removal actions.

Based upon the results of the investigations, Ameren implemented a series of pilot studies that evaluated several soil and groundwater treatment options and installed a GETS along the northern border of the Substation property.

On January 2, 2018, the EPA, Ameren, and MoDNR entered into an Administrative Settlement Agreement and Order on Consent (2018 ASAOC) to document the remedial investigation (RI) and feasibility study (FS) Ameren had already completed. The RI Report was finalized on May 1, 2019. The FS Report was finalized on March 2, 2020.

10.0 Community Participation

The EPA provides information regarding the cleanup of the Site to the public through public meetings, the AR file for the Site, and announcements published in the *Mid-Rivers News Magazine*. The EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities conducted there.

The RI Report, FS Report, Proposed Plan, and Community Involvement Plan for OU4 were made available to the public as they were completed, beginning in January 2018. The documents can be found in the AR file online at www.epa.gov/superfund/findettcorp. This information is also maintained at the EPA Region 7 office at 11201 Renner Boulevard in Lenexa, Kansas. The notice of the availability of the documents was published in the *Mid-Rivers News Magazine* on February 2, 2021. A public comment period was held from February 2, 2021 through March 1, 2021. In addition, a public meeting was held on February 9, 2021, to present the Proposed Plan to a broader community audience than those that had already been involved at the Site. At this meeting, representatives from the EPA and MoDNR were available to answer questions about, and accept comments on, the proposed remedy. Comments received

during the public meeting and comment period have been addressed in the Responsiveness Summary of this ROD (Appendix C).

11.0 Scope and Role of the Response Actions

Under CERCLA Section 121, 42 U.S.C. § 9621, and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In general, the goals for the remedial action are to prevent current and future exposure to contaminated groundwater, prevent further migration of contaminated groundwater, prevent future exposure to groundwater COCs via the vapor intrusion pathway, and return groundwater to beneficial use (i.e., drinking water) within a reasonable timeframe.

The Site is divided into four OUs (Appendix A, Figure 1):

- OU1 addresses the soil and groundwater contamination on the Findett property;
- OU2 addresses the soil contamination on the former Cadmus property;
- OU3 addresses affected groundwater that has migrated off the OU1/OU2 property boundaries; and
- OU4, the subject of this ROD, addresses source material and groundwater at the Substation.

The current status of OU1, OU2 and OU3 is discussed above in Section 9, Site History and Enforcement Activities. OU4 is the last of four operable units at the Site to be addressed through the remedial process. The proposed remedial action at OU4 will prevent current and future exposure to contaminated groundwater beneath the Substation. The exposure will be controlled through a combination of treatment and monitoring of contaminated groundwater and institutional controls.

12.0 Site Characteristics

This section of the ROD describes characteristics of the Site, including an overview of the Site, sampling strategy for the Site, contaminant source areas, extent of contaminants, and site hydrogeology. Detailed information about the Site's characteristics and sampling strategies can be found in documents in the AR, specifically the *Final RI Report, Findett OU4* (May 1, 2019).

12.1 Overview of Site

OU4 is an active electrical substation owned and operated by Ameren. Land in the vicinity of the Substation is industrial, commercial, recreational, and residential. Fountain Lakes Park abuts the Substation to the north, east, and south. The park includes walking trails, a skateboard park, and several lakes or ponds used for fishing. Highway 370 runs along the north side of the park. A residential development is located southeast of the park. An industrial area is located across Highway 370 and Huster Road to the west of the Substation. Agricultural land is located south of the park, and south and north of the industrial area. North and west of Highway 370 is continued agricultural land and additional industrial-commercial property.

12.2 Sampling Strategy for Site

On December 28, 2012, the EPA and Ameren entered into a Settlement Agreement and Administrative Order on Consent to:

- Perform soil and groundwater sampling at the Substation to determine to what extent the Substation property is a source of contamination contributing to the existing OU3 groundwater plume;
- Contain and treat contaminated groundwater migrating off the Substation property; and
- Evaluate future remedial and removal actions.

Based upon the results of the investigations, Ameren implemented a series of pilot studies that evaluated several soil and groundwater treatment options and installed a GETS along the northern border of the Substation property.

Pilot Study #1

In March 2014, the initial pilot study was conducted inside the Substation to evaluate the potential performance of three different in-situ remediation technologies in limited areas near electrical equipment at the Substation: zero valent iron (ZVI), potassium permanganate, and bioaugmentation. Within five months following the injection of potassium permanganate into three groundwater wells and at different soil depths near the Substation's Transformer 2 and its sump, PCE and trichloroethylene (TCE) concentrations in shallow groundwater decreased between 50-96%.

Decreases in PCE and TCE concentrations in groundwater were also observed following the injection of enhanced carbon ZVI into areas of elevated soil concentrations. Also, as a result of the biomass injection in groundwater downgradient of Transformer 2, significant reductions in contaminant concentration levels were observed, with PCE and TCE levels below detection limits, *cis*-1,2-DCE below its MCL, and VC slightly above its MCL.

Pilot Study #2

To evaluate and address impacted groundwater located north of the Substation (referred to as the Northern Plume), Ameren conducted a second pilot study in November 2014 and April 2015. The second pilot study included an injection of enhanced ZVI in groundwater north of City Well 5 and south of Highway 370, sodium persulfate injections in groundwater wells near City Well 5, and injection of sodium permanganate into the clay soil layer inside the Substation in areas with the highest COC concentrations near Transformer 2.

Within one year of the installation of ZVI permeable barriers, groundwater samples at monitoring well PZ-10 (the remaining monitoring well downgradient of the ZVI permeable barriers on the south side of Highway 370) were below the MCLs for all COCs. In addition, as of December 2015, sampling data from monitoring well PZ-2 (north of Highway 370) was below the MCLs for *cis*-1,2-DCE and VC, except for two quarters where VC was slightly above the MCL (2.1 and 4.2 micrograms per liter (µg/L), compared to the MCL of 2 µg/L). Currently, the concentrations of all COCs are below their respective MCLs in monitoring well PZ-2.

Following the injection of sodium persulfate around City Well 5, COC concentrations were reduced to below MCLs within eight months. There has been no rebound in concentration levels, and sampling data

from monitoring wells near City Well 5 continue to be below the MCLs, with the majority of sampling data in this area below detection limits for COCs.

In the second pilot study, sodium permanganate was applied to soil near Transformer 2 and in other areas to aggressively oxidize and significantly reduce COC concentrations and to limit the potential for further leaching into groundwater.

Pilot Study #3

In October 2016, Ameren conducted a third pilot study focused on the areas of maximum concentrations of COCs near Transformer 2 and along the center of the Substation. This pilot study expanded the biomass size injected into groundwater during the original pilot study to include groundwater below Transformer 2, the center of the Substation, and areas north of the electrical distribution equipment.

Within seven months following the augmentation injections, sampling data showed no detections of COCs in monitoring wells MW-10, MW-11, and MW-12, which are immediately downgradient of the wells that exhibited the highest concentrations of COCs (i.e., MW-8 and MW-13). In addition, concentrations of *cis*-1,2-DCE were reduced by 33% at MW-8 and 40% at MW-13. The VC concentrations at these locations have increased slightly, which is a positive indication of reductive de-chlorination.

Pilot Study #4

Based upon the results from prior studies, in August 2018, Ameren performed a fourth pilot study to address concentrations of COCs in the groundwater surrounding MW-8, MW-9, MW-13, and MW-14, as well as the residual COC concentrations in soils surrounding these monitoring wells and Transformer 2 (see Attachment C, Figures 3-6).

Bioaugmentation agents were injected into MW-8 and MW-13 to enhance reductive de-chlorination and to feed the existing biomass near MW-11 and MW-12. Additional bioaugmentation agents were also injected in MW-9 and MW-14, as well as wells IP-42, IP-45, and IP-46, because the previous quarter's data showed increasing COC concentrations, which may be indicative of continued mass flux of contaminants from soil to groundwater.

In 2012, the highest soil concentrations were PCE at 159,000 micrograms per kilogram (µg/kg), TCE at 14,700 µg/kg, *cis*-1,2-DCE at 11,400 µg/kg, and VC at 280 µg/kg. Soil samples were then collected prior to the injection of sodium permanganate into the soils in 2018. Soil concentrations prior to the targeted injections were PCE at 94 µg/kg (estimated), TCE at 28 µg/kg (estimated), *cis*-1,2-DCE at 3,860 µg/kg, and VC at 1,170 µg/kg. During the fourth pilot study, the higher concentration areas were targeted with additional injections of sodium permanganate to further oxidize the COCs; however, the amount injected was limited due to surfacing of oxidants after reaching maximum injection loading.

12.3 Contaminant Source Areas

Chlorinated solvents were historically used at the Substation for degreasing, metal cleaning, and removal and cleanup of transformer oils. VOCs, primarily consisting of PCE, TCE, *cis*-1,2-DCE, and VC have been detected in soil and groundwater at the Substation. In addition, chlorinated VOCs, primarily *cis*-1,2-DCE and VC, have been detected in groundwater to the north of the Substation. In

June 2010, VOCs that were potentially site-related were detected in City Well 5, which is located approximately 180-200 feet north of the Substation.

The source of PCE contamination and its degradation products at OU4 is Ameren's historic use of the product Mozel, which contained 18% PCE. It was used to clean oily surfaces prior to maintenance of Substation equipment. The initial investigation of OU4 identified the presence of VOCs on-site near electrical equipment, in both the soil and groundwater, with the highest concentrations being near Transformer 2.

12.4 Extent of Contaminants

Pre-Pilot Studies

During the initial investigation of OU4, a total of 44 soil borings were taken. The soil was logged consistently as silty clay to a depth of 34 feet, where it transitioned to a fine to medium-grained alluvial sand. All borings remained in this sand unit to depths up to 104 feet. During the 2012 investigation of OU4, PCE, TCE, *cis*-1,2-DCE, and VC were detected in soil at concentrations as high as 159,000 µg/kg, 14,200 µg/kg, 9,540 µg/kg, and 229 µg/kg, respectively.

During that same period, a total of 44 groundwater samples were profiled to various depths. Groundwater profiling was performed from a depth of 33-37 feet below ground surface (bgs) to a depth of 103-107 feet bgs (the bedrock surface at the bottom of the alluvium). Samples were obtained at 10-foot intervals. Groundwater concentrations of *cis*-1,2-DCE were as high as 93,000 µg/L. There was no indication of dense non-aqueous phase liquid at OU4.

Additional investigations further delineated the extent of VOCs in groundwater at OU4. Based on those investigations, the depth of groundwater contamination above the Safe Drinking Water Act MCLs was limited to a depth of 45 feet bgs, except at one location where the MCL for PCE, 5 µg/L, was exceeded at depths of 53-87 feet bgs.

Post-Pilot Studies

Soil – Soil concentrations of target compounds were reduced following the application of treatment technologies used during the various pilot studies. Post-treatment soil sampling data reflects a decrease in concentrations following the injection of both potassium and sodium permanganates into the silty clays.

Although the concentrations of PCE and TCE detected in pre-remedial Substation soil (2-10 feet bgs and 10-23 feet bgs) exceeded the EPA's industrial soil RSLs, no compounds exceeded the industrial soil RSLs in Substation soil samples collected post-pilot studies. Additionally, at 2-10 feet bgs, which is the depth of soil most likely to be contacted by future human receptors, none of the post-pilot study concentrations exceeded residential soil RSLs, which are protective for all types of human receptors. Although the concentrations of VC detected in a few deeper (> 20 feet bgs) post-pilot Substation soil samples exceed the EPA's residential soil RSL, none of the samples exceed a non-cancer hazard quotient of 1 (hazard quotient less than 1 means that toxic noncarcinogenic effects from that chemical are unlikely) or excess cancer risk of 1×10^{-4} (lifetime excess cancer risk of one in 10,000), which are the levels of risk that, when exceeded, warrant action under the NCP. Thus, none of the concentrations detected in any depth of soil after completion of the pilot studies poses unacceptable human health risks under a residential exposure scenario, so there are no COCs for OU4 soil.

Groundwater – The operation of the GETS has been effective in keeping COCs at OU4 from migrating into the former groundwater plume area north of OU4. In addition, the on-site pilot studies have been effective in reducing the COC concentrations in the groundwater in a short period of time.

The successive treatments applied during the pilot studies have resulted in significant reductions of groundwater contamination and the ongoing reductive de-chlorination of COCs. Current COCs in groundwater are 1,1-dichloroethylene, acetone, *cis*-1,2-DCE, PCE, toluene, *trans*-1,2-dichloroethylene *(trans*-1,2-DCE), TCE, and VC. Of the 17 monitoring wells on site, one well is slightly above the MCL for TCE; two wells exceed the MCL for *cis*-1,2-DCE (7,300 µg/L and 12,000 µg/L); and eight monitoring wells exceed the MCL for VC (3.4 µg/L to 1,900 µg/L). The current area with COC concentrations in groundwater above MCLs is limited to a small area surrounding Transformer 2. This is an improvement from pre-remedial concentration levels when only two monitoring wells were below the MCLs for all COCs.

12.5 Site Hydrogeology

Site geology consists of approximately 107 feet of unconsolidated alluvial sediments in the Mississippi River valley overlying consolidated limestone bedrock known as Mississippian-age St. Louis limestone. The Mississippi River alluvium is a high-yield aquifer that supplies water to the Elm Point Wellfield. The underlying St. Louis limestone is a massive gray fossiliferous limestone up to 100 feet thick. The unconsolidated materials above the limestone are a part of the flood plain of the Mississippi River, located approximately 2.8 miles north of the Site. The top 30-34 feet of the unconsolidated materials consist of clay with some silt, with silt content increasing in the last 10 feet above a sudden transition to silty fine-to-medium grained sand. The sand persists to the top of bedrock. Within the Substation there is approximately 2-3 feet of gravel fill placed on top of the clay. Beneath the three main transformers are pits approximately 6 feet deep that have been backfilled with coarse (3-5 inch) rock.

Ameren installed 17 monitoring wells at OU4 with 12 finished to depths of 45 feet within the sands of the alluvial aquifer; two are screened at a 1-foot interface between the clay and sands of the aquifer at 31-32 feet; and three are installed into clays surrounding Transformer 2 and at varying depths between 15-30 feet.

Shallow excavations within the Substation typically fill with water that appears to be perched water sitting on top of the native clay soil. As drilling continues deeper, the saturation depth typically appears at around 18 feet bgs in the silty clays. No free water is observed until the sand unit is penetrated at approximately 30 feet bgs. The sand is a semi-confined unit; wells screened in this unit (35-45 feet bgs) have varying static water levels dependent upon season and stage of the Mississippi River. In September 2012, depths to water were between 21 and 23 feet bgs. In April 2013, while the Mississippi River was above flood stage, depths to water in these same wells ranged from 11-12 feet bgs.

Measuring of groundwater elevations at various times indicates a consistent flow direction to the north-northwest with a typical gradient of 0.0007 foot/foot. Aside from regular seasonal fluctuations, significant changes to aquifer chemical conditions that might mobilize contaminants have not been observed nor are they anticipated.

12.6 Conceptual Site Model

A conceptual site model (CSM) describes the sources and potential migration pathways through which constituents may have been transported to other environmental media (receiving media), and the human and environmental receptors that may in turn contact the receiving media. The linkage between a receiving medium and potential exposure is called an exposure pathway. For an exposure pathway to be complete, the following conditions must exist (as defined by EPA (1989)):

- A source and mechanism of chemical release to the environment;
- An environmental transport medium (e.g., air, water, soil);
- A point of potential contact with the receiving medium by a receptor; and
- A receptor exposure route at the contact point (e.g., inhalation, ingestion, dermal contact).

If any of these four components are not present, the pathway is not complete. The components of the CSM for this Site are described below.

Sources

Chlorinated solvents were historically used inside the Substation for degreasing, transformer oil removal, and metal cleaning. VOCs, primarily comprised of PCE, TCE, *cis*-1,2-DCE and VC, have been detected in soil and groundwater at OU4. In addition, chlorinated VOCs, primarily *cis-1,2*-DCE and VC, have been detected in groundwater to the north of the Substation. In June 2010, VOCs that were potentially site-related were detected in City Well 5, which as noted above is located approximately 180-200 feet north of the Substation.

Migration Pathways and Receiving Media

Site investigation data indicate that VOCs in soil inside the Substation migrated vertically through soil to groundwater, dispersed in groundwater, and then migrated with groundwater flow downgradient to the north. Consequently, receiving media include soil and groundwater at the Substation and groundwater downgradient (north) of OU4.

VOC concentrations in Substation soil and in groundwater have substantially decreased following Ameren's pilot studies, which included both enhanced bioaugmentation and chemical oxidant injections in addition to the GETS installation. VOC concentrations in groundwater near City Well 5 (i.e., as measured at locations PZ-5, PZ-7 and PZ-8) have decreased to below MCLs, and as described in the RI Report, no detections of site-related VOCs have been reported in any City Wells since February 2016. The reductions in VOC concentrations that have taken place since the original sampling of the Site are documented in Appendices D and E of the RI Report (PZ database for wells located off-Substation and MW database for wells located on-Substation, respectively). The groundwater data indicate that the area of groundwater impacts is shrinking, as evidenced by fewer wells exhibiting concentrations of VOCs above drinking water standards. Presently, all VOC concentrations in monitoring wells and piezometers north of the Substation are below MCLs.

VOCs can partition from soil to outdoor air, and from soil and groundwater to soil gas. Soil gas containing VOCs can then migrate through interstitial soil pore space, and potentially be drawn into buildings located in close proximity to VOC sources. This migration pathway is referred to as vapor intrusion. Vapor intrusion can result in indoor air being a potential exposure medium for VOCs present in subsurface media. Based on information presented in the RI Report and recent groundwater sampling,

VOCs are not present in groundwater near any occupied buildings. The shortest distance between the leading edge of the plume (PZ-2) and the nearest existing occupied building is approximately 300 feet (building located to the north of Highway 370). Therefore, vapor intrusion of VOCs from groundwater to indoor air is not a current complete exposure pathway. However, VOCs were detected in Substation groundwater at concentrations above vapor intrusion screening levels (VISLs), indicating that the vapor intrusion pathway could be potentially complete if occupied buildings were constructed in that area in the future.

Although groundwater that discharges to surface water can result in migration of constituents to surface water, the Site investigation activities have demonstrated that VOCs are not present in downgradient groundwater at locations near surface water bodies, indicating that surface water is not a receiving medium for this Site.

Exposure Setting and Receptors

OU4 is an active electrical power substation. Due to safety concerns, access to the Substation is only granted to authorized personnel (Ameren employees or their contractors). Access by unauthorized persons does not occur due to fencing and locking gates. The ground within the Substation is covered with crushed stone. The use of the land where the Substation is located, including the entirety of Substation property, is not expected to change in the future. Therefore, potential receptors under current and future conditions include:

- Industrial workers (workers who maintain the Substation: current or future use);
- Construction workers (workers who may perform upgrades or modifications to the Substation that involve subsurface excavation: future use); and
- Future residents (future use of groundwater as drinking water and potential for vapor intrusion).

The surrounding land use is commercial, recreational, residential, and agricultural. However, the area north of the levee that is not on Substation property (i.e., where residual VOCs have been detected in groundwater) is presently open space. Hypothetically, that land could be developed for recreational, commercial, or residential uses. However, installation of private water supply wells in that area is prohibited by local ordinance.

Potential Exposure Pathways

Exposure pathways evaluated in the Human Health Risk Assessment (HHRA) that may potentially be complete are summarized below:

Substation Soil

- Although the ground within the Substation is covered with stone, which prevents direct contact with soil, the HHRA incorporates the assumption that industrial workers who access the Substation could be exposed to surface soil, and construction workers who may perform intrusive subsurface work at the Substation may contact surface and subsurface soil. Exposure to soil is assumed to occur by:

- Dermal contact, which occurs when a substance is absorbed through the skin following adherence of soil on the skin (e.g., when skin surfaces, such as hands, contact the soil);

- Incidental ingestion, which occurs when soil that has adhered to the skin is transferred to the mouth during incidental hand-mouth contact; and
- Inhalation, which can occur if VOCs partition from soil to the outdoor air as vapors or adsorb to particulates that are then released to the outdoor air as dust.

Soil North of the Substation

- Soil north of the Substation is not covered with stone, but there are no ongoing activities that would result in exposure to that soil. Since all soil samples were collected on Substation property, the HHRA incorporates the same exposure pathway assumptions for soil outside of the levee as it does for soil within the Substation.

Substation Groundwater

- Although the Substation will not be used for any purposes other than as a substation, the HHRA incorporates the assumption that groundwater beneath the Substation could be used as a future source of drinking water. Where groundwater is used as a source of drinking water, residents are assumed to potentially be exposed to Contaminants of Potential Concern (COPCs). The drinking water pathway assumes that residents use groundwater as a source of tap water and are exposed via ingestion of drinking water, dermal contact, and inhalation of VOCs that may be released from the water to indoor air during household uses, including bathing. Construction workers could potentially be exposed to COPCs in groundwater via incidental ingestion and dermal contact if shallow groundwater is encountered during excavation activities. However, OU4 groundwater is located at a depth (12 to 23 feet bgs) that is greater than depths that would realistically be encountered during excavation activities, indicating that direct contact with groundwater is not a complete exposure pathway for a construction worker.

Groundwater North of the Substation

- Although groundwater north of the Substation is used as a source of drinking water for the public water supply, no OU4-related constituents have been detected in the City wells since February 2016, and installation of private supply wells in the area north of the levee is prohibited by local ordinance. There are no occupied buildings in that area. Therefore, under current use conditions, there are no complete exposure pathways to groundwater north of the Substation. Furthermore, analytical results for ongoing groundwater monitoring of the area north of the Substation demonstrate that VOCs are below drinking water standards. Evaluation of Substation groundwater as a hypothetical future source of drinking water is expected for all groundwater associated with OU4.

Detailed information on the CSM and further explanation about potential exposure pathways and potential receptors can be found below in Section 14 or in the *Final RI HHRA Report, Findett OU4* (March 2019).

13.0 Current and Potential Future Land and Water Uses

Currently, OU4 is an active electrical power substation with restricted access. Future land use is not expected to change. Potential human receptors include current and future industrial workers who maintain the Substation and future construction workers who may perform upgrades or modifications involving subsurface excavation.

The Site is located in an area comprised primarily of mixed industrial and agricultural uses in the flood plain of the Mississippi River. Commercial development is projected to increase due to the proximity to Highway 370, which acts as an east/west bypass around the City and Interstate 70. Groundwater north of the levee is currently used as a source of drinking water for public water supply. No COCs have been detected in the City wells since February 2016. Installation of private supply wells in the area north of the levee is prohibited by local ordinance. There are no occupied structures inside the Substation and currently no structures in close proximity to groundwater where COCs have been detected.

Groundwater in the area is utilized by the City as a drinking water source and by others for industrial, commercial, agricultural (livestock and irrigation) and domestic uses. Groundwater in the area is considered potable. Missouri considers drinking water to be the highest beneficial use of groundwater due to the reliance on groundwater for public and private water supplies.

14.0 Summary of Site Risks

CERCLA requires the EPA to seek permanent solutions to protect human health and the environment from hazardous substances. These solutions provide for removal, treatment, or containment of hazardous substances and pollutants and contaminants so any remaining contamination does not pose an unacceptable risk to human receptors, ecological receptors, or the environment.

In 2019, a HHRA was prepared to provide an evaluation of the potential threat to human health and the environment in the absence of any remedial action. A Screening Level Ecological Risk Assessment (SLERA) was conducted at OU4. It concluded that the ecological risks at OU4 were low. The risk assessments provide the basis for determining whether remedial action is necessary and the justification for performing remedial actions. The risk assessments support the evaluation of the remedial alternatives for OU4 and support the recommended remedy leading to the final ROD.

14.1 Summary of Human Health Risk Assessment

The HHRA estimates what risks the Site poses if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the HHRA for this Site. The HHRA evaluates the potential risks to human health and the environment due to releases of chemicals at OU4. The main objective of this HHRA is to provide the information necessary to assist in the decision-making process. The specific objectives of the HHRA are to:

- Identify and provide analysis of baseline risks (defined as risks that might exist if no remediation or institutional controls were applied at the Site) and help determine what action is needed at the Site;
- Provide a basis for determining the levels of chemicals that can remain on site and still not adversely impact public health and the environment; and
- Provide a basis for comparing potential health and environmental impacts of various remedial alternatives.

The HHRA results are used to document the magnitude of potential risk at OU4 and the associated cause(s) of that risk. The results also help determine what, if any, remedial response actions may be necessary and assist in establishing the cleanup goals.

14.1.1 Identification of Chemicals of Potential Concern

In a HHRA, all contaminants detected in environmental media (i.e., groundwater, soil, air, etc.) are first compared to risk-based screening levels. Any contaminants that exceed the risk-based screening levels are considered COPCs and are carried through the risk assessment. The HHRA identified PCE; TCE; 1,1-DCE; *cis*-1,2-DCE; *trans*-1,2-DCE; VC; acetone; and toluene as COPCs in groundwater at the Substation, using the EPA's tapwater RSLs for comparison (Appendix A, Table 12). Of these, PCE; TCE; *cis*-1,2-DCE; and VC were also identified as COPCs in groundwater north of the levee (Appendix A, Table 13). For soil, PCE and TCE were identified as COPCs in pre-pilot studies data, using the EPA's industrial soil RSLs, which are protective of industrial workers (Appendix A, Tables 3 and 4). VC was the sole COPC identified in post-pilot studies data in comparison with the EPA's residential soil RSLs, which are protective for all types of human receptors, including adult and child residents (Appendix A, Table 11).

14.1.2 Exposure Assessment

The exposure assessment identified the current and future populations of humans that use or access the Substation and area north of the levee, the mechanisms or exposure pathways by which those humans may be potentially exposed to COPCs, and the magnitude of exposure that may occur through the potential exposure pathways.

Soil

Using industrial soil RSLs, while PCE and TCE were identified as COPCs in pre-pilot study Substation soil (2-10 feet bgs and 10-23 feet bgs), no COPCs were identified in post-pilot study Substation soil (2-10 feet bgs and 10-23 feet bgs). This indicates that, based on the post-pilot study (current) conditions, residual VOC concentrations in OU4 soils are below concentrations that would pose a de minimis risk for continued industrial use of OU4 (Appendix A, Tables 2, 3, 4, 8, and 9).

Using residential soil RSLs, which are lower and protective of all potential human receptors, no COPCs were identified in post-remedial Substation soil (2-10 feet bgs). VC was identified as a COPC in post-remedial Substation soil (10-23 feet bgs) due to one exceedance of the residential soil RSLs at a depth of 20.5 feet bgs, and the HHRA documented additional exceedances at 25 feet bgs. The HHRA assumes that there are no complete exposure pathways to soil greater than 10 feet bgs. However, in the unlikely event that subsurface soil at 20 to 25 feet bgs were brought to the surface, the samples with residential soil RSL exceedances were further examined. As previously mentioned in Section 12.4, none of these samples pose a non-cancer hazard quotient greater than 1 or an excess cancer risk greater than 1×10^{-4}, which are the levels of risk that, when exceeded, warrant action under the NCP. Therefore, no quantitative evaluation of risks for potential exposures to Substation soil was required in the HHRA (Appendix A, Tables 10 and 11).

No COPCs were identified in pre-remedial soil north of the Substation (0-2 feet bgs, 2-10 feet bgs, or 10-23 feet bgs). Therefore, no quantitative evaluation of risks for potential exposures to soil north of the Substation was required in the HHRA (Appendix A, Tables 5, 6, and 7).

Groundwater

Using tapwater RSLs, COPCs were identified for groundwater under the Substation and north of the levee (Attachment A, Tables 12 and 13). However, there are no current complete exposure pathways associated with potable use of groundwater. Specifically:

- Substation groundwater is not used as a source of potable water and will not be used as such in the foreseeable future;
- Substation groundwater is not a potential source of VOCs to municipal water because the groundwater containment system and bioaugmentation mass injected has controlled potential migration of VOCs to the north of the Substation;
- No VOCs have been detected in a City municipal well since February 2016;
- Although COPCs were identified in groundwater north of the levee based on detected concentrations above tapwater RSLs, VOC concentrations in groundwater north of the Substation are all currently below the MCLs, indicating that the Site is not currently a contaminant source for City Well 5 water. Furthermore, the ZVI permeable barrier controls further potential migration of VOCs north of City Well 5; and
- Even if VOCs were detected in groundwater north of the levee at concentrations above the MCL, and groundwater entered a municipal well at concentrations above the MCL, the water from multiple City wells is blended before being distributed. The blending, as well as various drinking water treatment processes, would significantly reduce or eliminate VOCs in municipal drinking water.

Nonetheless, in accordance with EPA guidance for baseline risk assessments (EPA, 1989), the HHRA incorporates the assumption that groundwater within the VOC plume could be used as a source of drinking water in the future. Therefore, the Substation groundwater dataset evaluated in the HHRA represents data from the core of the groundwater plume and is used as a conservative estimate of potential future exposure. There are three exposure routes by which humans can be exposed to COPCs in groundwater: ingestion, dermal contact, and inhalation of VOCs that may be released from groundwater to indoor air during household uses of the water. Potentially complete exposure pathways for future receptors at OU4 are presented below and in Attachment A, Table 14:

Receptor Type	Exposure Point	Exposure Pathway
Future Resident	Core of Plume (within Substation)	Ingestion as Drinking Water Dermal Contact Inhalation of VOCs

Vapor intrusion is an incomplete pathway for current land use conditions. There are no occupied structures at the Substation, and it is not anticipated that occupied structures will be built at the Substation in the future. There are currently no structures in close proximity to groundwater where VOCs have been detected. The nearest occupiable building to the downgradient edge of the plume (PZ-2) is approximately 300 feet away, on the north side of Highway 370. Therefore, the vapor intrusion exposure pathway is incomplete under current use conditions.

To evaluate the potential for vapor intrusion to be a complete pathway if occupied buildings are constructed in the future, the maximum concentrations of VOCs that were detected in Substation groundwater were compared to EPA residential VISLs for shallow groundwater. VISLs were calculated using the November 2018 EPA VISL Calculator, (EPA, 2018c), and assuming a target excess cancer risk of 1×10^{-5} (lifetime excess cancer risk of one in 100,000), a target non-cancer hazard quotient of 1,

and a groundwater temperature of 17°C. PCE, TCE, and VC were detected at concentrations in substation groundwater above the VISLs, indicating that the vapor intrusion pathway could potentially be complete if buildings were constructed over the core of the plume in the future.

No VOCs were detected in groundwater north of the Substation at concentrations above VISLs. However, the maximum reporting limit for non-detects for VC of 2 µg/L is slightly above the VISL of 1.78 µg/L. VC was detected in only two of fourteen groundwater samples in the data set for groundwater north of the Substation, at concentrations of 0.1 µg/L and 0.6 µg/L. This suggests that, although the reporting limit for VC is above the VISL, VC is unlikely to be present in groundwater north of the Substation at concentrations above the VISL. Therefore, the vapor intrusion pathway is unlikely to be complete if occupied buildings were constructed over that portion of the plume.

Direct contact with groundwater is an incomplete exposure pathway for all receptors. Of the receptors identified at OU4, only construction workers are anticipated to do subsurface work. However, it is anticipated that future construction would not likely extend deeper than 10 feet bgs. Groundwater depths measured during Site investigation activities range from 12 feet bgs to 23 feet bgs. Consequently, groundwater is not expected to be encountered during construction activities.

14.1.3 Toxicity Assessment

The toxicity assessment identifies the types of potential adverse health effects (such as cancer or birth defects) associated with exposure to a contaminant and the relationship between adverse health effects and the exposure level. When performing risk assessments, EPA evaluates carcinogenic and noncarcinogenic effects of various chemicals present at a site. Carcinogenic and noncarcinogenic health effects are evaluated independently due to the different toxicological endpoints, relevant exposure duration, and methods used to characterize risk.

Toxicity values were obtained from the following hierarchy of sources in accordance with the EPA Office of Superfund Remediation and Technology Innovation (EPA, 2003):

- Tier 1 – Integrated Risk Information System (IRIS) (EPA, 2018)
- Tier 2 – Provisional Peer-Reviewed Toxicity Values
- Tier 3 – Other (Peer-Reviewed) Values, including Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (ATSDR, 2017)

Carcinogenic and noncancer toxicity information that is relevant to the COCs is provided in Appendix A, Tables 15-17.

14.1.4 Risk Characterization

For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk (ELCR) is calculated from the following equation:

$$Risk = CDI \times SF$$

where: risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day or $\mu g/m^3$)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$ or $(\mu g/m^3)^{-1}$

An excess lifetime cancer risk of 1 x 10^{-6} indicates that an individual has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it is in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. Under the NCP, the EPA's generally acceptable risk range for site-related exposures is 1 x 10^{-6} to 1 x 10^{-4}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with an oral or dermal reference dose (RfD) or an inhalation reference concentration (RfC) derived for a similar exposure period. An RfD or RfC represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). A HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD or RfC, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all COPCs that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. A HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. A HI greater than 1 indicates that site-related exposures may present a risk to human health.

The 2019 HHRA quantified estimates of potential health risks to a future residential (adult and child) receptors exposed to Substation groundwater via ingestion, dermal contact, and inhalation of VOCs, based on data collected from the core of the groundwater plume (Appendix A, Table 18). Potential future resident (adult and child) exposure to Substation groundwater is associated with an ELCR of 2 x 10^{-1}. The cancer risks are above the NCP risk range of 10^{-6} to 10^{-4}. The cumulative HI is 950, which is above the target HI of 1. COPCs in OU4 groundwater have RfD and RfC values that are based on effects on different target organs, as shown in Table 18. The HIs for Substation groundwater based on target organ are also above 1, due to the HQs associated with *trans*-1,2-DCE, *cis*-1,2-DCE, PCE, TCE, and VC.

The maximum detected COPC concentrations within the core of the groundwater plume were between one and four orders of magnitude higher than VISLs (Appendix A, Table 12). This indicates that if construction of an occupied building was to occur over the core of the groundwater plume, vapor intrusion exposures could be associated with risks above the NCP acceptable risk levels and that further assessment of the vapor intrusion pathway would be required.

14.1.5 Uncertainties

Conducting a risk assessment requires making numerous assumptions, which introduces uncertainty in the risk and hazard estimates. The main uncertainties in the HHRA are associated with data quality, exposure estimation, and toxicological data. There is considerable uncertainty in the HHRA associated with the acute and chronic non-cancer hazard estimates based on non-detected results. A detailed discussion of the uncertainties for each step of the HHRA process is provided in the HHRA Addendum.

Based on the information provided in the RI Report, the groundwater data indicate that VOC concentrations in groundwater outside the core of the plume are decreasing (downward trends). Within the core of the plume, concentrations of PCE and TCE are decreasing, while concentrations of degradation products (*cis*-1,2-DCE and VC) are decreasing in some wells and variable in other wells as the plume continues to degrade. The area of groundwater impacts is shrinking, as evidenced by fewer

wells exhibiting concentrations of VOCs above drinking water standards. Therefore, while the groundwater data used in the HHRA is representative of the time period over which it was collected, information provided in the RI Report suggests that the level of contaminants in groundwater will continue to decrease in the future.

14.2 Ecological Risk Assessment

A SLERA was conducted at OU4. It concluded that the ecological risks at OU4 were low. Specifically, the SLERA stated that potential adverse risks to aquatic or terrestrial receptors exposed to contaminants at OU4 are unlikely and that contaminated groundwater from OU4 does not appear to be negatively impacting ecological receptors.

The information presented in the SLERA is sufficient to support the RI/FS and the development of a final remedy. No further data are required to assess ecological risks.

14.3 Basis for Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Using Reasonable Maximum Exposure assumptions, potential risks of cancer and non-cancer health effects to future receptors exceeded thresholds of concern, due to contamination in groundwater.

In the unlikely event OU4 is redeveloped for residential purposes in the future, residents at or near OU4 could be exposed to contaminants in groundwater via ingestion and dermal contact, if wells are installed that draw on the contaminated portion of the aquifer for tapwater. Future residents or industrial workers could also be exposed to hazardous air contaminants via vapor intrusion if homes or office buildings are allowed to be built on top of the contaminant plume. Industrial workers could also be exposed to contaminants at OU4 in the future, if wells are installed that draw on the contaminated portion of the aquifer for tap water.

Current contaminant levels indicate potential health risks from future exposure to contaminated groundwater at OU4 warrant remedial action. Groundwater COCs that primarily contributed to these risks of cancer and non-cancer health effects include PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, and VC.

15.0 Remedial Action Objectives

CERCLA, as amended by Section 121(b) of the Superfund Amendments and Reauthorization Act, requires selection of remedial actions to attain a degree of cleanup that ensures protection of human health and the environment, are cost effective, and use permanent solutions and alternative treatment technologies or resource technologies. To satisfy CERCLA requirements, RAOs were developed for the OU4 remedy. The RAOs were used to develop the remedial alternatives for OU4.

The RAOs developed for OU4 are:

- Prevent exposure to the COCs above their MCLs in groundwater;
- Prevent potential future risks to human receptors from inhalation of groundwater COCs via the vapor intrusion pathway;

- Prevent future migration of groundwater contamination off site; and
- Restore groundwater to beneficial use (i.e., at or below MCLs) within a reasonable timeframe.

The Selected Remedy will ensure that current and future receptors are not exposed to contaminated groundwater in the drinking water aquifer or indoor air and will restore the aquifer to beneficial use in a reasonable timeframe. The cleanup levels for the Selected Remedy are the MCLs for the OU4 COCs. Achieving the MCLs provides endpoint concentrations for each exposure route and provides protection for all potential current and future receptors.

The Selected Remedy complies with applicable or relevant and appropriate requirements (ARARs) and Safe Drinking Water Act standards.

Actions performed under the 2012 AOC, the 2018 ASAOC, or voluntarily by Ameren have resulted in attaining the RAOs for groundwater north of the Substation and have made significant progress towards those goals within the Substation. The RAO for soil has been achieved as described in the previous section.

16.0 Description of Remedial Alternatives

A summary of remedial alternatives to address risks to human health and the environment and to achieve remediation goals are as follows:

1. No Action;
2. In-Situ Chemical Oxidation (ISCO), Enhanced Bioaugmentation Attenuation (Enhanced Bio), GETS, and Institutional Controls (ICs); and
3. Enhanced Bio, GETS, and ICs.

The EPA has selected Alternative 3 for the reasons discussed below.

16.1 Alternative 1 – No Action

The "no action" alternative provides a baseline reference to evaluate other alternatives. A no further action approach maintains OU4 in its current condition without additional measures to control exposures.

This alternative includes leaving OU4 as is, with no additional response actions performed. While a no action alternative is applicable to areas of OU4 where MCLs are not exceeded, it is the application of this alternative to the groundwater beneath a limited area of the Site that is evaluated here.

The City relies on groundwater for its water supply needs and OU4 is located within the City's well field. Accordingly, this alternative is not effective in providing protection to human health and the environment and will not reduce the toxicity, mobility, or volume of the COCs. This alternative would not meet the RAOs.

Capital Cost	$0
Annual Operation & Maintenance (O&M)	$0
Present Worth Cost	$0
Time to Meet RAOs	> 30 years

16.2 Alternative 2 – ISCO, Enhanced Bio, GETS, and ICs

ISCO involves the injection of at least one oxidant to chemically break down the COCs to produce non-toxic end products. As part of the pilot test studies, Ameren considered a variety of oxidant products. Both potassium and sodium permanganate were evaluated.

Ameren conducted three pilot studies to assess the effectiveness of chemical oxidation. While such measures proved effective, care must be taken so the chemical reactions are exercised to completion so as not to produce toxic end products, such as VC. In fact, according to the HHRA, the soil has reached both industrial and residential RSLs and no additional measures are necessary to mitigate health risks associated with potential exposures to Substation soil. The pilot studies have shown that chemical oxidation using permanganates (sodium or potassium) has been successful in the reduction of the COCs in the clay soils at OU4. The remaining low concentrations in groundwater north of the Substation are below levels that would likely benefit from additional ISCO injections.

Enhanced bioaugmentation is defined as the use of *Dehalococcoides* (an anerobic bacteria capable of reductive dechlorination) to enhance existing natural attenuation processes in groundwater. This alternative consists of a carefully controlled and monitored site cleanup approach that will reduce contaminant concentrations in groundwater to levels that are protective of human health and the environment within a reasonable timeframe. Enhanced bioaugmentation includes the physical, chemical, and biological processes that reduce the mass, toxicity, mobility, volume, or concentration of contaminants. This requires extensive monitoring, data evaluation and risk assessment considerations.

Enhanced bioaugmentation techniques were evaluated in the first, third, and fourth pilot studies, which targeted the contaminants present in groundwater within the sand unit at OU4. A combined injection of an extended life organic substrate (bioaugmentation to promote bacterial growth) combined with *Dehalococcoides* was tested to stimulate biodegradation in the sand unit.

The enhanced bio performed well because the sand unit at OU4 is conducive to a broader and more consistent spread of injectants**.** In fact, during multiple pilot studies, Ameren enhanced the naturally-occurring processes by adding naturally occurring *Dehalococcoides* in the areas of highest groundwater impact. Resulting reductions in groundwater contaminant concentrations are being tracked using quarterly sampling of monitoring wells in and adjacent to the impacted groundwater area. The COC concentrations have been greatly reduced and the majority of monitoring wells are now below the MCLs for all COCs.

In 2014 a GETS was installed at the north end of the Substation property and inside the flood berm. The GETS is comprised of three extraction wells with one inside and two outside the bermed area, and an air stripper housed in an aboveground structure inside the Substation. Groundwater from the extraction wells is pumped through the air stripper to remove VOCs prior to surface discharge.

The three extraction wells are screened at 35-45 feet bgs and can operate at a combined rate of approximately 62 gallons/minute. The current groundwater extraction rate is 16 gallons/minute. Groundwater flow moves through the shallow aquifer at a hydraulic conductivity rate of approximately 30 feet per day. When the GETS is operating, the capture zone appears to be adequate to contain remaining contaminated groundwater within the Substation.

This alternative has already been implemented during pilot studies at the Site and has reduced the size of the groundwater plume to a small area within the Substation. All groundwater north of the Substation is

below MCLs for all site COCs. Biomass has been injected downgradient from Transformer 2, creating an attenuation zone that reduces COCs as groundwater passes through the zone. The GETS should be placed in standby mode because the biomass has spread and is being collected on filter screens within the GETS. Continued water extraction could dissipate the biomass, thereby undermining ongoing groundwater treatment. The GETS would remain at OU4 but be placed in standby mode. Ongoing monitoring can be focused on biomass application areas to confirm ongoing degradation and evaluate potential for augmentation if necessary. Under this alternative, the GETS would be restarted under the circumstances described below. Periodic inspection and maintenance of the GETS may be necessary to keep the system operational.

Engineering controls such as site or area berms and fencing are included with this alternative and help control exposure pathways. To ensure that public access to OU4 remains restricted, security measures have been taken at OU4 to include fencing, locked gates, restricted access to approved personnel, digging restrictions, and soil management and disposal practices.

ICs in the form of an environmental covenant, or other equivalent proprietary control, will be executed and filed with the Recorder of Deeds prohibiting the installation of potable water wells and construction of buildings within the Substation without prior notification to and approval by the EPA and the state.

Under this alternative, the GETS will initially be placed in standby status. However, if the MCL is exceeded for one event for any COC outside of the Substation or there is an increasing Mann-Kendall[3] trend inside the Substation for four consecutive quarters, a remedial action of restarting the GETS, ISCO or enhanced bio, or a combination of the three will be implemented. The GETS and/or enhanced bioaugmentation would continue to be implemented until the groundwater COCs show a declining Mann-Kendall trend for four consecutive quarters.

Cost per Application	$35,000 Bio $75,000 ISCO
GETS Annual O&M	$130,000
Annual Groundwater Monitoring	$100,000
Annual Present Worth Cost	$340,000
Time to Meet RAOs	< 10 years

16.3 Alternative 3 – Enhanced Bio, GETS, and ICs

This alternative is the same as Alternative 2, except that it does not include ISCO injections. This alternative has already been implemented during pilot studies and has reduced the size of the groundwater plume to a small area within the Substation. All groundwater north of the Substation is below MCLs for all site COCs. Biomass has been injected downgradient from Transformer 2, creating an attenuation zone that reduces COCs as groundwater passes through the zone. The GETS should be placed in standby mode because the biomass has spread and is being collected on filter screens within the GETS. Continued water extraction could dissipate the biomass, thereby undermining ongoing groundwater treatment. The GETS would remain at OU4 but be placed in standby mode. Ongoing monitoring can be focused on biomass application areas to confirm ongoing degradation and evaluate potential for augmentation if necessary. Under this alternative, the GETS would be restarted under the circumstances described below. Periodic inspection and maintenance of the GETS may be necessary to keep the system operational.

[3] The Mann-Kendall Trend Test is used to analyze data collected over time for consistently increasing or decreasing trends.

Engineering controls such as site or area berms and fencing are included with this alternative and help control exposure pathways. To ensure that public access to OU4 remains restricted, security measures have been taken at OU4 to include fencing, locked gates, restricted access to approved personnel, digging restrictions, and soil management and disposal practices.

ICs in the form of an environmental covenant, or other equivalent proprietary control, will be executed and filed with the Recorder of Deeds prohibiting the installation of potable water wells and construction of buildings within the Substation without prior notification to and approval by the EPA and the state.

Under this alternative, the GETS will initially be placed in stand-by status. However, if the MCL is exceeded for one event for any COC outside of the substation or there is an increasing Mann-Kendall trend inside the Substation for four consecutive quarters, a remedial action of restarting the GETS, or enhanced bio, or a combination of the two will be implemented. The GETS and/or enhanced bio would continue to be implemented until the groundwater COCs show a declining Mann-Kendall trend for four consecutive quarters.

Bio per Application	$35,000
GETS Annual O&M Cost	$130,000
Annual Groundwater Monitoring	$100,000
Annual Present Worth Cost	$265,000
Time to Meet RAOs	< 10 years

17.0 Summary of Comparative Analysis of Alternatives

The NCP provides that the ROD must explain how the nine criteria at 40 C.F.R. § 300.430 (f)(5)(i) were used to select the remedy. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The first two criteria, overall protection of human health and the environment and compliance with ARARs, are threshold criteria that the Selected Remedy must meet. The Selected Remedy must then represent the best balance of the following five primary balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility or volume of contaminants through treatment; short-term effectiveness; implementability; and cost. The final two criteria, state and community acceptance, are referred to as modifying criteria.

In accordance with the NCP, the nine criteria are used to evaluate the different remediation alternatives individually and against each other to select a remedy. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The detailed analysis of alternatives can be found in the March 2020 Final Feasibility Study.

17.1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1 would not protect human health and the environment from the contamination in the groundwater at OU4. Since no action would be conducted under Alternative 1, the potential for exposure

to the contaminants left on-site would exist if further use, development, or re-zoning of the Substation property occurred.

Alternatives 2 and 3 would both be protective of human health and the environment because groundwater contaminants that exceed MCLs would be removed and the community would be protected from exposure through the use of engineering and institutional controls.

17.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain ARARs unless such ARARs are waived under CERCLA section 121(d)(4). ARARs include substantive provisions of any promulgated federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally ARARs for a CERCLA site or action. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, or contaminant; remedial action; location; or other circumstance at a CERCLA site. Relevant and appropriate requirements, while not legally applicable to circumstances at a particular CERCLA site, address problems or situations similar to those encountered at the site, such that their use is considered relevant and appropriate. (See Appendix A, Table 19 ARARs table.)

Alternative 1 does not comply with chemical-specific ARARs. Since Alternative 1 does not meet the threshold criteria, it will no longer be carried through the analysis of all nine criteria. Alternatives 2 and 3 comply with chemical-specific ARARs and action-specific ARARs.

17.3 Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

Alternatives 2 and 3 would remove contaminants from groundwater and eliminate residual risk at OU4.

17.4 Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

This criterion evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants; the degree of expected reduction in toxicity, mobility or volume; the type and quantity of treatment residuals; the degree to which the treatment will be irreversible; and the risk posed by residual contamination.

Alternatives 2 and 3 would reduce the toxicity, mobility, and volume of on-site contaminants over time. The potential for exposure during the attenuation processes would be evaluated through groundwater monitoring. Alternatives 2 and 3 would involve treatment of contaminated groundwater, thus meeting the statutory preference for treatment as a principal element; hence, reducing mobility, toxicity, and volume of contaminants.

17.5 Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and mitigate any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

As noted above, actions associated with Alternatives 2 and 3 have been completed through the various pilot studies, and if additional actions are necessary, would have minimal adverse impacts to workers, the community or the environment. Both of these alternatives are expected to take approximately ten years to reach cleanup goals.

17.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives 2 and 3 have remedies that have previously been implemented at OU4 as pilot studies. The continuous operation of the alternatives is technically and administratively easy to implement.

17.7 Cost

This criterion evaluates the estimated capital, operation and maintenance, and present value costs (using a present value discount rate of 7%) of each alternative. The cost estimates are approximate and made without detailed engineering data. Cost estimates involve approximation, assumptions, estimations, interpretation, and engineering judgment. The actual cost of the project would depend on the final scope of the remedial actions and other factors presently unknown. Cost estimates are expected to be accurate within a range of +50 to -30 percent. The estimated annual total present worth cost for Alternatives 2 and 3 are:

Alternative 2 **Operation and Maintenance Costs**	
Bio-Augmentation	$35,000 per application
Chemical Oxidation	$75,000 per application
Monitoring and Sampling	$100,000 annually
Restart GETS (if necessary)	$10,000 plus $120,000 per year operation
Total Present Worth Cost	$340,000

Alternative 3 **Operation and Maintenance Costs**	
Bio-Augmentation	$35,000 per application
Monitoring and Sampling	$100,000 annually
Restart GETS (if necessary)	$10,000 plus $120,000 per year operation
Total Present Worth Cost	$265,000

17.8 State Acceptance

This criterion considers whether the state, based on its review of the information, concurs with, opposes, or has no comment on the EPA's Selected Remedy. The state's authority regarding acceptance has been

delegated to MoDNR. The MoDNR concurs with the Selected Remedy. MoDNR's concurrence with the preferred remedial alternative as set forth in the Proposed Plan, and chosen as the Selected Remedy in this ROD, is included in Appendix D.

17.9 Community Acceptance

This criterion considers whether the local community agrees with the EPA's analysis and Preferred Alternative. Comments received on the Proposed Plan are important indicators of community acceptance.

The public comment period on the Proposed Plan for the preferred remedial action was February 2, 2021 through March 1, 2021. A virtual public meeting was held on February 9, 2021, to explain the Proposed Plan and all the alternatives presented in the FS. During the public meeting, no disagreement with the Preferred Alternative was expressed by individual members of the local community. Thirteen comments were received during the comment period; seven comments from commenter #1 and six comments from commenter #2. Both sets of comments were very similar in nature. The EPA's response to these comments can be found in the Responsiveness Summary in Appendix C. The full text of the transcript of the public meeting is included in the AR. The preferred alternative was not changed due to any comments received.

18.0 Principal Threat Waste

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site whenever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile, and that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Prior to the pilot studies, the Substation source area soil contamination was considered to be "principal threat waste" because the COCs were detected at concentrations that posed a significant risk. The COCs contained in the source area soils were moving into the groundwater and presenting a threat to the municipal water supply. However, the contaminated soils were addressed by ISCO. None of the remaining COC concentrations in Substation soil pose unacceptable human health risks under a residential exposure scenario. Although contaminated groundwater also poses a risk, it is not considered a "principal threat waste" as defined by EPA guidance. The principal threat wastes have been effectively treated through previous remedial actions at OU4.

19.0 Selected Remedy

This section expands upon the details of the Selected Remedy from that provided in the Description of Alternatives section of this ROD. This section provides the appropriate level of detail about the engineering details and estimated costs for the Selected Remedy so the design engineer has enough information to initiate the design phase of the response action. This will minimize the likelihood of

unanticipated changes to the scope and intent of the Selected Remedy. This discussion is organized in four sections: (1) Summary of the Rationale for the Selected Remedy; (2) Description of the Selected Remedy; (3) Summary of Estimated Remedy Costs; and (4) Expected Outcomes of the Selected Remedy.

19.1 Summary of the Rationale for the Selected Remedy

Based on the information currently available, the EPA believes that the Selected Remedy meets the two threshold criteria and provides the best balance of trade-offs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA § 121(b): 1) be protective of human health and the environment; 2) comply with ARARs (or justify a waiver); 3) be cost-effective; 4) use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element.

The Preferred Alternative in the Proposed Plan included a statement that prohibited the excavation of soil greater than 10 feet. This was identified based on an exceedance of the residential soil RSL for VC at 20 feet bgs. As discussed in Section 12.4, further examination of the samples with residential soil RSL exceedances showed that none of the concentrations pose a non-cancer hazard quotient greater than 1 or an excess cancer risk greater than 1×10^{-4}, which are the levels of risk that, when exceeded, warrant action under the NCP. Thus, while subsurface concentrations of some COCs at the Substation were elevated prior to the pilot studies, none of the concentrations detected after completion of the pilot studies pose unacceptable human health risks, and a prohibition on excavation is not necessary for the protection of human health. The prohibition on excavation of soil greater than 10 feet has been removed and is not part of the Selected Remedy.

The Selected Remedy was chosen over the other alternatives because it is expected to achieve the cleanup goal of reducing the concentration of chlorinated solvents in groundwater by the most cost-effective means and is easily implemented.

19.2 Description of the Selected Remedy

Although the EPA does not expect significant changes to this remedy, it may change somewhat as a result of changes in the plume. Any significant changes to the remedy described in this ROD would be documented by a memorandum to the file, an Explanation of Significant Differences (ESD), or a ROD Amendment, as appropriate and consistent with the applicable regulations and guidance.

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives, and with the state's concurrence, the EPA has selected Alternative 3 – Enhanced Bio, GETS, and ICs. This remedy is selected because the pilot studies have already shown the GETS and enhanced bio to be viable technologies to remove chlorinated solvents from groundwater. Alternative 3 will also continue to achieve substantial risk reduction by both treating the source area under Transformer 2 and providing safe management of remaining material.

Based upon results obtained thus far from various pilot studies and confirmed by the most recent September 2020 sampling event, COCs at OU4 have responded to treatment applications and continue to degrade. Compliance with federal drinking water MCLs for the COCs is achievable within an acceptable remedial timeframe. All off-site monitoring wells (PZ 1-12) and approximately half of the 17 Substation monitoring wells already satisfy the RAO criteria. As reflected in monthly National Pollutant

Discharge Elimination System sampling, influent concentrations into the GETS (MW 5) of *cis*-1,2-DCE are well below the MCL and VC is at 3.8 µg/L (MCL is 2.0 µg/L).

The Selected Remedy includes the following:

- Naturally occuring *Dehalococcoides,* an anerobic bacteria capable of reductive dechlorination, along with nutrients to support the bacteria (enhanced bioaugmentation), have been injected downgradient from the Substation's Transformer 2, creating an attenuation zone that reduces COCs as groundwater passes through the zone;
- The existing GETS, in operation since 2014, can be placed in stand-by status to allow the enhanced bioaugmentation to continue to reduce the contaminant plume. While in standby status, inspection and maintenance of the GETS may be necessary to keep the system operational;
- Ongoing monitoring will be performed to confirm ongoing degradation and evaluate the need for additional bioaugmentation. Wells demonstrating compliance with the MCLs for an extended period and no longer needed for monitoring will be removed from monitoring and abandoned in accordance with state requirements. The specific wells designated for this purpose will be identified in a groundwater monitoring plan;
- A remedial action of restarting the GETS, or additional enhanced bioaugmentation, or a combination of the two, must be implemented if the MCL is exceeded for one event for any COC found in groundwater outside of the Substation, or there is an increasing Mann-Kendall trend of any COC in groundwater inside the Substation for four consecutive quarters. The GETS and/or enhanced bioaugmentation would continue to be implemented until the groundwater COCs show a declining Mann-Kendall trend for four consecutive quarters;
- ICs in the form of an environmental covenant, or other equivalent proprietary control, will be executed and filed with the Recorder of Deeds Office, prohibiting the installation of potable water wells and construction of buildings within the Substation without prior notification to and approval by the EPA and the state; and
- Engineering controls such as site or area berms and fencing to control exposure pathways. To ensure that public access to OU4 remains restricted, security measures will continue to be taken and documented at OU4, including fencing, locked gates, restricted access to approved personnel, digging restrictions, and soil management and disposal practices.

No significant changes have been made to the Selected Remedy identified in the Proposed Plan. However, two points need clarification and additional detail. The first point regards groundwater monitoring and additional biomass applications. The Proposed Plan states "Ongoing monitoring can be focused on biomass application areas to confirm ongoing degradation and evaluate potential for augmentation if necessary." The intention of this statement was neither to place limits on groundwater monitoring nor to indicate that additional biomass applications are currently required. Rather, groundwater monitoring will occur at the Site throughout the implementation of the remedy to monitor the continued effectiveness of the enhanced bio, to provide information for evaluation as to whether additional enhanced bio and/or restarting the GETS is needed, and to indicate when the RAOs have been achieved.

The second point is that there are no remaining COCs in soil, and thus no restriction on soil excavations is necessary. The Proposed Plan states "Ameren will execute and file with the Recorder of Deeds Office an environmental covenant, or other equivalent proprietary control, limiting the installation of potable water wells and soil excavations greater than 10 feet." However, as described above in Section 12.4 Extent of Contamination, although the concentrations of VC detected in a few deeper (> 20 feet bgs) post-pilot Substation soil samples exceed the EPA's residential soil RSL, none of the samples exceed a non-cancer hazard quotient of 1 or excess cancer risks of 1×10^{-4}, which are the levels of risk that, when

exceeded, warrant action under the NCP. None of the concentrations detected in any depth of soil after completion of the pilot studies pose unacceptable human health risks under a residential exposure scenario. Thus, no restriction on soil excavation at the Site is necessary.

The EPA believes the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA § 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; and (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

19.3 Cost Estimate for the Selected Remedy

The total present worth cost for enhanced bio, restart of the GETS, and quarterly groundwater sampling is $265,000 per year. This figure does not include additional dollars if more than one bioaugmentation is needed per year. The total present worth cost provides an annualized breakdown of capital, annual, and periodic costs. The capital cost of the GETS is not included in this amount since it has already been installed (see table below). More details on the development of the cost estimates can be found in the FS.

Alternative 3 Operation and Maintenance Costs	
Bio-Augmentation	$35,000 per application
Monitoring and Sampling	$100,000 annually
Restart GETS (if necessary)	$10,000 plus $120,000 per year operation
Total Present Worth Cost	$265,000

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum to the AR file, an ESD, or a ROD Amendment. This is an engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

19.4 Estimated Outcomes of the Selected Remedy

The Selected Remedy will: 1) be protective of human health and the environment, 2) comply with ARARs; 3) be cost effective; and 4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. There will be no negative impact to the socio-economic environment. The Selected Remedy is expected to achieve the RAOs identified for OU4.

The RAOs developed for OU4 are:

- Prevent exposure to the COCs above their MCLs in groundwater;
- Prevent potential future risks to human receptors from inhalation of groundwater COCs via the vapor intrusion pathway;
- Prevent future migration of groundwater contamination off-site; and
- Restore groundwater to beneficial use (i.e., at or below MCLs) within a reasonable timeframe.

The Selected Remedy's timeframe to attain RAOs in approximately 10 years. The cleanup levels for the COCs are shown in the table below.

COC	MCL (µg/L)
PCE	5
TCE	5
cis-1,2-DCE	70
trans-1,2-DCE	100
1,1-Dichloroethene	7
VC	2

19.4.1 Available Land Uses

The Selected Remedy will not alter the current land use at OU4, which is industrial use. The Selected Remedy will meet risk reduction criteria for the unlikely scenario of a future residential land use; however, OU4 will likely remain an electrical substation for the foreseeable future.

19.4.2 Available Groundwater Uses

The Selected Remedy will be protective of groundwater because the Selected Remedy, which is already operating, will be used to restore groundwater to its beneficial use as a source of drinking water. Current estimates indicate that cleanup levels will be attained throughout the contaminated portion of the aquifer in approximately 10 years.

20.0 Statutory Determinations

Under CERCLA Section 121, 42 U.S.C. § 9621, and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The following sections discuss how the Selected Remedy meets these statutory requirements.

20.1 Protection of Human Health and the Environment

The Selected Remedy will restore the groundwater to beneficial use (i.e., drinking water use). The current potential for exposure to the groundwater contamination would be controlled by implementation of institutional controls. There are no short-term threats associated with the Selected Remedy. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

20.2 Compliance with ARARs

Sections 300.430(f)(5)(ii)(B) and (C) of the NCP require that a ROD describe federal and state ARARs that the Selected Remedy will attain or provide a justification for any waivers. The Selected Remedy will comply with all ARARs. Groundwater will be in compliance with ARARs. Because the lower aquifer meets the characteristics of a potential drinking water supply, the MCL drinking water standards are considered relevant and appropriate.

20.3 Cost-Effectiveness

Cost-effectiveness is determined by evaluating the remedy's long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness. If the overall cost of the remedy is proportional to its overall effectiveness, then it is considered to be cost-effective. The Selected Remedy at an estimated cost of $265,000 satisfies the criteria listed above because it offers a permanent solution through the degradation of contaminants in groundwater while also costing less than other evaluated alternatives. Therefore, the Selected Remedy is cost-effective.

20.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

The EPA has determined the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at OU4. When compared to the other alternatives that were evaluated, the EPA has determined the Selected Remedy provides the best balance of tradeoffs in terms of the five balancing criteria and state and community acceptance.

The Selected Remedy was selected over the other groundwater alternatives because it will achieve cleanup goals by the most cost-effective means, provide substantial and long-term risk reduction through bioaugmentation and groundwater extraction, and is easily implemented. The Selected Remedy is expected to allow the Substation and surrounding properties to be used for future land use, which could be residential. The Selected Remedy satisfies the criteria for long-term effectiveness through ICs and the degredation of contaminants in groundwater.

20.5 Preference for Treatment as a Principal Element

Prior to conducting the pilot studies in 2014, the source area soil contamination was considered to be principal threat waste because the COCs were detected at concentrations that posed a significant risk. The COCs contained in the source area soils were moving into the groundwater and presenting a threat to the municipal water supply. However, when the last pilot study was completed in 2018, the contaminated soils were addressed by ISCO, enhanced bio, and GETS, and soil confirmation sampling results indicate PCE concentrations were below the soil cleanup level of 60 µg/kg. The principal threat wastes in soil have been effectively treated and/or removed through the four pilot studies at OU4. Although contaminated groundwater also poses a risk, it is not considered a principal threat waste as defined by EPA guidance.

20.6 Five-Year Review Requirements

CERCLA Section 121 and the NCP require a review of remedial actions (RAs) at least every five years if the RA results in hazardous substances, pollutants, or contaminants remaining in place above levels that allow for unlimited use and unrestricted exposure. Because the Selected Remedy will result in hazardous substances, pollutants or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the RA to ensure that the remedy is, or will be, protective of human health and the environment.

21.0 Documentation of Significant Changes

To fulfill CERCLA §117(b) and NCP §§ 300.430(f)(5)(iii)(B) and 300.430(f)(3)(ii)(A) requirements, the ROD must document and discuss the reasons for any significant changes made to the Selected Remedy. Changes described in this section must be limited to those that could have been reasonably

anticipated by the public from the time the Proposed Plan and RI/FS Report were released for public comment to the final selection of the remedy.

The Proposed Plan for Findett OU4 was released for public comment on February 2, 2021. The Proposed Plan identified the Preferred Alternative – Enhanced Bio, GETS, and ICs. The EPA received two sets of comments/questions during the public comment period; seven from commenter #1 and six from commenter #2. Both sets of comments were very similar in nature. Based on an evaluation of those comments, it was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PART III: RESPONSIVENESS SUMMARY

This responsiveness summary has been prepared in accordance with CERCLA and the NCP. This document provides the EPA's response to all significant comments received regarding the Proposed Plan from the public during the public comment period.

On February 2, 2021, the EPA published the Proposed Plan, which discussed the EPA's proposed actions necessary to protect the public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment. The public comment period on the Proposed Plan was from February 2, 2021 through March 1, 2021.

On February 9, 2021, the EPA held a public meeting using virtual internet technologies. The Proposed Plan for OU4 was presented at the public meeting and a court reporter recorded the proceedings of the meeting. Copies of the transcript and attendance list are included in the AR. The public comment period and the public meeting were intended to elicit public comment on the Proposed Plan. The EPA received and responded to 13 comments/questions on the Proposed Plan (Appendix C). No change was made to the remedy as a result of these comments.

APPENDIX A
TABLES

TABLE 1: SELECTION OF EXPOSURE PATHWAYS AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI FILE NO. 130500

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
CURRENT	**Groundwater**	**North of Levee Groundwater**	North of Levee	Resident	Adult	Dermal	None	Although groundwater north of the levee is used as a source of drinking water for public water supply, no Site -related constituents have been detected in the City Wells since February 2016, and installation of private supply wells in the area north of the levee is prohibited by local ordinance. There are no occupied buildings in that area. Therefore, under current use conditions, there are no complete exposure pathways to off-site groundwater.
						Inhalation	None	
						Ingestion	None	
					Child	Dermal	None	
						Inhalation	None	
						Ingestion	None	
				C/I Worker	Adult	Dermal	None	
						Inhalation	None	
						Ingestion	None	
				Construction Worker	Adult	Dermal	None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
						Inhalation	None	
						Ingestion	None	
	Soil/ Groundwater	**Indoor Air**	Substation and North of Levee	Resident	Adult	Inhalation	None	There are no occupied structures at the Substation, and it is not anticipated that occupied structures will be built at the Substation in the future. The shortest distance between the leading edge of the plume and the nearest building is approximately 300 feet (building located to the north of Huster Road). Therefore, vapor intrusion of VOCs from site soil/groundwater to indoor air is not a current complete exposure pathway.
					Child	Inhalation	None	
				C/I Worker	Adult	Inhalation	None	
CURRENT/ FUTURE	**Soil**	**Soil 0 - 2 ft**	Substation and North of Levee	C/I Worker	Adult	Dermal	Quantitative	Commercial workers are assumed to contact surface soil during outdoor activities, while working at the property.
						Ingestion	Quantitative	
		Soil 0-23 ft	Substation and North of Levee	Construction Worker	Adult	Dermal	Quantitative	Construction/excavation workers are assumed to incidentally ingest and dermally contact surface and subsurface soil during redevelopment work.
						Ingestion	Quantitative	
		Air - Dust	Substation and North of Levee	C/I Worker	Adult	Inhalation	Quantitative	Windborne dust can be inhaled by persons at or down-wind of unvegetated soil.
				Construction Worker	Adult	Inhalation	Quantitative	Excavation activities could produce dust.
		Air - Vapors	Substation and North of Levee	C/I Worker	Adult	Inhalation	Quantitative	VOCs partitioned from soil to outdoor air as vapors can be inhaled by persons at or down-wind of unvegetated soil.
				Construction Worker	Adult	Inhalation	Quantitative	VOCs partitioned from soil to outdoor air as vapors could be produced during excavation activities.
	Soil/ Groundwater	**Surface Water**	Surface Water	Recreational Visitor	Adult	Dermal	None	Although groundwater that discharges to surface water can result in migration of constituents to surface water, the Site investigation activities have demonstrated that VOCs are not present in downgradient groundwater at locations near surface water bodies, indicating that surface water is not a receiving medium for this Site.
						Inhalation	None	
						Ingestion	None	
					Child	Dermal	None	
						Inhalation	None	
						Ingestion	None	
FUTURE	**Groundwater**	**Substation Groundwater**	Substation	Resident	Adult	Dermal	Quantitative	There are no current potential exposure pathways associated with groundwater beneath the substation. Although the substation will not be used for any purposes other than as a substation, potential exposure pathways associated with groundwater beneath the substation will be evaluated for future residential drinking water exposures.
						Inhalation	Quantitative	
						Ingestion	Quantitative	
					Child	Dermal	Quantitative	
						Inhalation	Quantitative	
						Ingestion	Quantitative	

				C/I Worker	Adult	Dermal Inhalation Ingestion	None None None	The residential scenario is protective for commercial workers; therefore, a commercial worker scenario is not quantitatively evaluated.
				Construction Worker	Adult	Dermal Inhalation Ingestion	None None None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
	Soil/ Groundwater	**Indoor Air**	Substation	Resident	Adult	Inhalation	Quantitative	The potential for vapor intrusion to be a complete pathway for future residential receptors if occupied buildings are constructed in the future is evaluated in the HHRA.
					Child	Inhalation	Quantitative	
				C/I Worker	Adult	Inhalation	None	The residential scenario is protective for commercial workers; therefore, a commercial worker scenario is not quantitatively evaluated.
	Groundwater	**North of Levee Groundwater**	North of Levee	Resident	Adult	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	Evaluation of groundwater as a future source of drinking water is based on analytical data for the core of the plume, which is located in the substation property.
					Child	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	
				C/I Worker	Adult	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	
				Construction Worker	Adult	Dermal Inhalation Ingestion	None None None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
	Soil/ Groundwater	**Indoor Air**	North of Levee	Resident	Adult	Inhalation	None	Evaluation of groundwater as a future source of vapor intrusion is based on analytical data for the core of the plume, which is located in the substation property.
					Child	Inhalation	None	
				C/I Worker	Adult	Inhalation	None	

Notes:
bgs = below ground surface. C/I = Commercial/Industrial. ft = feet.
HHRA = Human Health Risk Assessment.
VOCs = Volatile Organic Compounds.

TABLE 2: SUMMARY OF SUBSTATION SURFACE SOIL DATA (0-2 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)
	Volatile Organic Compounds									
526-73-8	1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene	0.0719	0.0719	mg/kg	SS-18 (0-3 ft)		200			No BSL
95-63-6	1,3,5-Trimethylbenzene	0.0482	0.0482	mg/kg	SS-18 (0-3 ft)	0.102	180			No BSL
108-67-8	2-Butanone (Methyl Ethyl Ketone)	0.0035 J	0.0035 J	mg/kg	SB-40 (1-2 ft)	0.102	150			No BSL
78-93-3	2-Phenylbutane (sec-Butylbenzene)	0.018 J	0.018 J	mg/kg	SB-40 (1-2 ft)	0.102	19000			No BSL
135-98-8	Acetone	0.0137	0.0137	mg/kg	SS-18 (0-3 ft)	1.02	12000			No BSL
67-64-1	Chloromethane (Methyl Chloride)	0.0085 J	0.41 J	mg/kg	SB-30 (0-3 ft)	0.102	67000			No BSL
74-87-3	cis-1,2-Dichloroethene	0.0062 J	0.0062 J	mg/kg	SB-36 (0-3 ft)	0.41	46			No BSL
156-59-2	Cymene (p-Isopropyltoluene)	0.0058	0.0079	mg/kg	SS-09 (0-3 ft)	0.204	230			No BSL
99-87-6	Ethylbenzene	0.0035	0.0035 J	mg/kg	SS-18 (0-3 ft)	0.102	990			No BSL
100-41-4	Isopropylbenzene	0.0014 J	0.0015 J	mg/kg	SB-40 (1-2 ft)	0.102	25			No BSL
98-82-8	(Cumene) m,p-Xylenes	0.001 J	0.0011 J	mg/kg	SS-18 (0-3 ft)	0.102	990			No BSL
179601-23-1	Methylene chloride o-	0.0011 J	0.0045 J	mg/kg	SB-40 (1-2 ft)	0.102	250			No BSL
75-09-2	Xylene	0.0009 J	0.098	mg/kg	SB-30 (0-3 ft)	0.102	320			No BSL
95-47-6	Tetrachloroethene	0.0014 J	0.002	mg/kg	SB-40 (1-2 ft)	0.098	280			No BSL
127-18-4	Toluene	0.0009 J	J 2	mg/kg	SS-09 (0-3 ft)	0.102 2	39			No BSL
108-88-3	Trichloroethene	0.0008 J	0.004 J	mg/kg	Dup SS-05 0-3 ft	0.102	4700			No BSL
79-01-6	PCBs	0.0173	0.107	mg/kg	SS-09 (0-3 ft)	0.107	1.9			No BSL
11096-82-5	Aroclor-1260 (PCB-1260)	0.022 J	0.022 J	mg/kg	SS-19 (0-3 ft)	0.0551	0.99			No BSL

TABLE 3: SUMMARY OF SUBSTATION SUBSURFACE SOIL DATA (2-10 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (a)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (b)	
	Volatile Organic Compounds			mg/kg							
	1,1-Dichloroethene			mg/kg							
75-35-4	1,2,4-Trimethylbenzene	0.0012 J	0.0012 J	mg/kg	SB-14 (8-9 ft)	0.565	100			No	BSL
95-63-6	1,3,5-Trimethylbenzene	0.0021 J	0.0021 J	mg/kg	SB-28 dup (6-7 ft)	0.565	180			No	BSL
108-67-8	2-Butanone (Methyl Ethyl Ketone)	0.1 J	0.18	mg/kg	SB-41 (5-6 ft)	0.18	150			No	BSL
78-93-3	2-Phenylbutane (sec-Butylbenzene)	0.014 J	0.02 J	mg/kg	SB-44 (3-4 ft)	5.65	19000			No	BSL
135-98-8	Acetone	0.0043 J	0.18	mg/kg	SB-41 (5-6 ft)	0.18	12000			No	BSL
67-64-1	cis-1,2-Dichloroethene	0.011 J	0.66 J	mg/kg	SB-39 (7-8 ft)	5.65	67000			No	BSL
156-59-2	Ethylbenzene	0.0017 J	10.7	mg/kg	SB-41 (5-6 ft)	10.7	230			No	BSL
100-41-4	Isopropylbenzene	0.0012 J	0.17	mg/kg	SB-39 (7-8 ft)	0.17	25			No	BSL
98-82-8	(Cumene) m,p-Xylenes	0.059 J	0.3	mg/kg	SB-39 (7-8 ft)	0.3	990			No	BSL
179601-23-1	Methylene chloride n-	0.0012 J	0.12	mg/kg	SB-39 (7-8 ft)	0.15	250			No	BSL
75-09-2	Butylbenzene n-	0.001 J	0.031 J	mg/kg	SB-39 (7-8 ft)	0.565	320			No	BSL
104-51-8	Propylbenzene o-Xylene	0.063 J	0.063 J	mg/kg	SB-39 (7-8 ft)	0.565	5800			No	BSL
103-65-1	Tetrachloroethene	0.03 J	0.23	mg/kg	SB-39 (7-8 ft)	0.23	2400			No	BSL
95-47-6	Tetrahydrofuran	0.0014 J	0.0014 J	mg/kg	SB-28 dup (6-7 ft)	0.565	280			No	BSL
127-18-4	Toluene	0.0012 J	35	mg/kg	SB-39 (7-8 ft)	35	39			No	BSL
109-99-9	trans-1,2-Dichloroethene	0.13 J	0.13 J	mg/kg	SB-42 (2-3 ft)	5.65	9400			No	BSL
108-88-3	Trichloroethene	0.0012 J	0.0114	mg/kg	SB-12 (9-10 ft)	0.565	4700			No	BSL
156-60-5	Vinyl chloride	0.0012 J	0.0058 J	mg/kg	SB-11 (8-9 ft)	0.565	2300			No	BSL
79-01-6		0.0026 J	6.78	mg/kg	SB-39 (7-8 ft)	6.78	1.9			Yes	ASL
75-01-4		0.0014 J	0.45	mg/kg	SB-39 (7-8 ft)	0.45	1.7			No	BSL

TABLE 4: SUMMARY OF SUBSTATION SUBSURFACE SOIL DATA (10-23 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (a)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (b)
	Volatile Organic Compounds									
	1,1-Dichloroethene			mg/kg						
75-35-4	1,2,3-Trimethylbenzene	0.0009 J	0.0091	mg/kg	SB-10 (17-18 ft)	1.25	100			No BSL
526-73-8	1,2,4-Trimethylbenzene	0.059 J	0.059 J	mg/kg	SB-39 (14-15 ft)	1.25	200			No BSL
95-63-6	1,3,5-Trimethylbenzene	0.0021 J	0.048 J	mg/kg	SB-39 (14-15 ft)	1.25	180			No BSL
108-67-8	2-Phenylbutane(sec-	0.13 J	0.13 J	mg/kg	SB-41 (22-23 ft)	1.25	150			No BSL
135-98-8	Butylbenzene)	0.0016 J	0.15 J	mg/kg	SB-39 (14-15 ft)	1.25	12000			No BSL
67-64-1	Acetone	0.012 J	0.71	mg/kg	SB-39 (18-19 ft)	12.5	67000			No BSL
156-59-2	cis-1,2-Dichloroethene	0.0014 J	11.4	mg/kg	SB-41 (15-16 ft)	11.4	230			No BSL
179601-23-1	m,p-Xylenes	0.001 J	0.0029 J	mg/kg	SB-10 (17-18 ft)	1.25	250			No BSL
75-09-2	Methylene chloride	0.0011 J	0.0079	mg/kg	SB-14 (21-22 ft)	1.25	320			No BSL
104-51-8	n-Butylbenzene	0.23 J	0.23 J	mg/kg	SB-41 (14-15 ft)	1.25	5800			No BSL
103-65-1	n-Propylbenzene	0.1 J	0.1 J	mg/kg	SB-41 (14-15 ft)	1.25	2400			No BSL
95-47-6	o-Xylene	0.0015 J	0.0015 J	mg/kg	SB-30 (22-23 ft)	1.25	280			No BSL
127-18-4	Tetrachloroethene	0.0065	195	mg/kg	SB-41 (14-15 ft)	195	39			Yes ASL
108-88-3	Toluene	0.0009 J	0.0103	mg/kg	SB-15 (14-15 ft)	1.25	4700			No BSL
156-60-5	trans-1,2-Dichloroethene	0.001 J	0.0207	mg/kg	SB-10 (17-18 ft)	1.25	2300			No BSL
79-01-6	Trichloroethene	0.0016 J	14.4	mg/kg	SB-41 (15-16 ft)	14.4	1.9			Yes ASL
75-01-4	Vinyl chloride	0.0011 J	0.525	mg/kg	SB-41 (22-23 ft)	0.525	1.7			No BSL

TABLE 5: SUMMARY OF NORTH OF LEVEE SURFACE SOIL DATA (0-2 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Residential Soil RSL (HI = 0.1, ELCR = 1e-06) (a)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (b)
	Volatile Organic Compounds									
67-64-1	Acetone	0.016 J	0.016 J	mg/kg	SB-26 (0-3 ft)	0.0595	6100			No BSL
75-09-2	Methylene chloride	0.0011 J	0.0018 J	mg/kg	SB-21 (1-2 ft)	0.0059	35			No BSL
108-88-3	Toluene	0.0016 J	0.0032 J	mg/kg	SB-25 (0-3 ft)	0.0059	490			No BSL

TABLE 6: SUMMARY OF NORTH OF LEVEE SUBSURFACE SOIL DATA (2-10 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
	Volatile Organic Compounds						`				
67-64-1	Acetone	0.013 J	0.0573	mg/kg	SB-19 (4-5 ft)	0.0629	67000			No	BSL
75-09-2	Methylene chloride	0.0012 J	0.0024 J	mg/kg	SB-21 (7-8 ft)	0.0059	320			No	BSL
127-18-4	Tetrachloroethene	0.0016 J	0.0016 J	mg/kg	SB-21 (7-8 ft)	0.0063	39			No	BSL
108-88-3	Toluene	0.0012 J	0.0012 J	mg/kg	SB-18 (9-10 ft)	0.00731	4700			No	BSL

TABLE 7: SUMMARY OF NORTH OF LEVEE SUBSURFACE SOIL DATA (10-23 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
	Volatile Organic Compounds						`				
67-64-1	Acetone	0.01 J	0.025 J	mg/kg	SB-26 (18-19 ft)	0.0628	67000			No	BSL
179601-23-1	m,p-Xylenes	0.0011 J	0.002 J	mg/kg	SB-25 (11-12 ft)	0.0071	250			No	BSL
75-09-2	Methylene chloride Toluene	0.001 J	0.0044 J	mg/kg	SB-26 (18-19 ft)	0.0063	320			No	BSL
108-88-3		0.0009 J	0.0052	mg/kg	SB-19 (14-15 ft)	0.0071	4700			No	BSL

TABLE 8: SUMMARY OF SUBSTATION POST-REMEDIAL SUBSURFACE SOIL DATA (2-10 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
	Volatile Organic Compounds			mg/kg							
526-73-8	1,2,3-Trimethylbenzene	0.0023 J	0.0023 J	mg/kg	IP-32-5.0	0.0786	200			No	BSL
95-63-6	1,2,4-Trimethylbenzene	0.0009 J	0.0009 J	mg/kg	IP-32-5.0	0.0786	180			No	BSL
108-67-8	1,3,5-Trimethylbenzene	0.0015 J	0.0015 J	mg/kg	IP-32-5.0	0.0786	150			No	BSL
78-93-3	2-Butanone (Methyl Ethyl Ketone)	0.013 J	0.013 J	mg/kg	IP-32-5.0	0.983	19000			No	BSL
135-98-8	2-Phenylbutane (sec-Butylbenzene)	0.0007 J	0.0007 J	mg/kg	IP-32-5.0	0.0786	12000			No	BSL
67-64-1	Acetone	0.0568	0.0809	mg/kg	IP-32-5.0	0.983	67000			No	BSL
71-43-2	Benzene	0.0004 J	0.0004 J	mg/kg	IP-32-5.0	0.0393	5.1			No	BSL
75-15-0	Carbon disulfide	0.064 J	0.064 J	mg/kg	IP-33-5.0	0.115	350			No	BSL
74-87-3	Chloromethane (Methyl Chloride)	0.13 J	0.14 J	mg/kg	IP-33-5.0	0.14	46			No	BSL
99-87-6	Cymene (p-Isopropyltoluene)	0.0009 J	0.0009 J	mg/kg	IP-32-5.0	0.0786	990			No	BSL
110-54-3	Hexane	0.0023 BJ	0.072 BJ	mg/kg	IP-32-5.0	0.072	250			No	BSL
75-09-2	Methylene chloride	0.0062 J	0.18 J	mg/kg	IP-32-5.0	0.18	320			No	BSL
95-47-6	o-Xylene	0.0007 J	0.0007 J	mg/kg	IP-32-5.0	0.157	280			No	BSL
127-18-4	Tetrachloroethene	0.003 J	0.003 J	mg/kg	IP-28-6	0.0786	39			No	BSL
108-88-3	Toluene	0.0005 J	0.0005 J	mg/kg	IP-32-5.0	0.0786	4700			No	BSL
79-01-6	Trichloroethene	0.0006 J	0.0006 J	mg/kg	IP-28-6	0.0786	1.9			No	BSL

TABLE 9: SUMMARY OF POST REMEDIAL SUBSURFACE SOIL DATA (10-23 FT BGS) AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Industrial Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
	Volatile Organic Compounds			mg/kg							
75-35-4	1,1-Dichloroethene	0.0007 J	0.0024	mg/kg	IP-28-15	0.0044	100			No	BSL
526-73-8	1,2,3-Trimethylbenzene	0.0065	0.0065	mg/kg	IP-33-10	0.0065	200			No	BSL
95-63-6	1,2,4-Trimethylbenzene	0.0019 J	0.0019 J	mg/kg	IP-33-10	0.0044	180			No	BSL
108-67-8	1,3,5-Trimethylbenzene	0.0111	0.0111	mg/kg	IP-33-10	0.0111	150			No	BSL
78-93-3	2-Butanone (Methyl Ethyl Ketone)	0.008	0.0091 J	mg/kg	IP-29-10.5	0.0544	19000			No	BSL
135-98-8	2-Phenylbutane (sec-Butylbenzene)	0.0241	0.0241	mg/kg	IP-33-10	0.0241	12000			No	BSL
67-64-1	Acetone	0.0245	0.0581	mg/kg	IP-29-10.5	0.0581	67000			No	BSL
75-15-0	Carbon disulfide	0.0011 J	0.0041 J	mg/kg	IP-29-10.5	0.0109	350			No	BSL
156-59-2	cis-1,2-Dichloroethene	0.0017 J	3.86	mg/kg	IP-36-20.5	3.86	230			No	BSL
99-87-6	Cymene (p-Isopropyltoluene)	0.0037	0.0037	mg/kg	IP-33-10	0.0044	990			No	BSL
100-41-4	Ethylbenzene	0.0021 J	0.0021 J	mg/kg	IP-33-10	0.0044	25			No	BSL
110-54-3	Hexane	0.0014 BJ	0.0054 BJ	mg/kg	IP-38-14	0.0054	250			No	BSL
98-82-8	Isopropylbenzene (Cumene)	0.0009 J	0.0009 J	mg/kg	IP-33-10	0.0044	990			No	BSL
179601-23-1	m,p-Xylenes	0.0039 J	0.0039 J	mg/kg	IP-33-10	0.0087	250			No	BSL
75-09-2	Methylene chloride	0.005 J	0.012 J	mg/kg	IP-38-14	0.012	320			No	BSL
104-51-8	n-Butylbenzene	0.0322	0.0322	mg/kg	IP-33-10	0.0322	5800			No	BSL
103-65-1	n-Propylbenzene	0.0074	0.0074	mg/kg	IP-33-10	0.0074	2400			No	BSL
95-47-6	o-Xylene	0.0014 J	0.0014 J	mg/kg	IP-33-10	0.0087	280			No	BSL
127-18-4	Tetrachloroethene Toluene	0.0007 J	0.0368	mg/kg	IP-28-15	0.0368	39			No	BSL
108-88-3	trans-1,2-Dichloroethene	0.0005 BJ	0.0005 BJ	mg/kg	IP-36-20.5	0.0044	4700			No	BSL
156-60-5	Trichloroethene	0.0015 J	0.0583	mg/kg	IP-36-20.5	0.0583	2300			No	BSL
79-01-6	Vinyl chloride	0.0009 J	0.0019	mg/kg	IP-28-15	0.0044	1.9			No	BSL
		0.0011 J	0.295	mg/kg	IP-36-20.5	0.295	1.7			No	BSL

TABLE 10: SUMMARY OF SUBSTATION POST-REMEDIAL SUBSURFACE SOIL DATA (2-10 FT BGS) AND SELECTION OF RESIDENTIAL COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.		Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Residential Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
		Volatile Organic Compounds			mg/kg							
526-73-8		1,2,3-Trimethylbenzene	0.0023 J	0.0023 J	mg/kg	IP-32-5.0	0.0786	34			No	BSL
95-63-6		1,2,4-Trimethylbenzene	0.0009 J	0.0009 J	mg/kg	IP-32-5.0	0.0786	30			No	BSL
108-67-8		1,3,5-Trimethylbenzene	0.0015 J	0.0015 J	mg/kg	IP-32-5.0	0.0786	27			No	BSL
78-93-3		2-Butanone (Methyl Ethyl Ketone)	0.013 J	0.013 J	mg/kg	IP-32-5.0	0.983	2700			No	BSL
135-98-8		2-Phenylbutane (sec-Butylbenzene)	0.0007 J	0.0007 J	mg/kg	IP-32-5.0	0.0786	780			No	BSL
67-64-1		Acetone	0.0568	0.0809	mg/kg	IP-32-5.0	0.983	6100			No	BSL
71-43-2		Benzene	0.0004 J	0.0004 J	mg/kg	IP-32-5.0	0.0393	1.2			No	BSL
75-15-0		Carbon disulfide	0.064 J	0.064 J	mg/kg	IP-33-5.0	0.115	77			No	BSL
74-87-3		Chloromethane (Methyl Chloride)	0.13 J	0.14 J	mg/kg	IP-33-5.0	0.14	11			No	BSL
99-87-6		Cymene (p-Isopropyltoluene)	0.0009 J	0.0009 J	mg/kg	IP-32-5.0	0.0786	190			No	BSL
110-54-3		Hexane	0.0023 BJ	0.072 BJ	mg/kg	IP-32-5.0	0.072	61			No	BSL
75-09-2		Methylene chloride	0.0062 J	0.18 J	mg/kg	IP-32-5.0	0.18	35			No	BSL
95-47-6		o-Xylene	0.0007 J	0.0007 J	mg/kg	IP-32-5.0	0.157	65			No	BSL
127-18-4		Tetrachloroethene	0.003 J	0.003 J	mg/kg	IP-28-6	0.0786	8.1			No	BSL
108-88-3		Toluene	0.0005 J	0.0005 J	mg/kg	IP-32-5.0	0.0786	490			No	BSL
79-01-6		Trichloroethene	0.0006 J	0.0006 J	mg/kg	IP-28-6	0.0786	0.41			No	BSL

TABLE 11: SUMMARY OF POST REMEDIAL SUBSURFACE SOIL DATA (10-23 FT BGS) AND SELECTION OF RESIDENTIAL COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect		Concentration Used for Screening (a)	November 2018 Residential Soil RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	
	Volatile Organic Compounds											
	1,1-Dichloroethene			mg/kg								
75-35-4	1,2,3-Trimethylbenzene	0.0007 J	0.0024	mg/kg	IP-28-15		0.0044	23			No	BSL
526-73-8	1,2,4-Trimethylbenzene	0.0065	0.0065	mg/kg	IP-33-10		0.0065	34			No	BSL
95-63-6	1,3,5-Trimethylbenzene	0.0019 J	0.0019 J	mg/kg	IP-33-10		0.0044	30			No	BSL
108-67-8	2-Butanone (Methyl Ethyl Ketone)	0.0111	0.0111	mg/kg	IP-33-10		0.0111	27			No	BSL
78-93-3	2-Phenylbutane (sec-Butylbenzene)	0.008	0.0091 J	mg/kg	IP-29-10.5		0.0544	2700			No	BSL
135-98-8	Acetone	0.0241	0.0241	mg/kg	IP-33-10		0.0241	780			No	BSL
67-64-1	Carbon disulfide	0.0245	0.0581	mg/kg	IP-29-10.5		0.0581	6100			No	BSL
75-15-0	cis-1,2-Dichloroethene	0.0011 J	0.0041 J	mg/kg	IP-29-10.5		0.0109	77			No	BSL
156-59-2	Cymene (p-Isopropyltoluene)	0.0017 J	3.86	mg/kg	IP-36-20.5		3.86	16			No	BSL
99-87-6	Ethylbenzene	0.0037	0.0037	mg/kg	IP-33-10		0.0044	190			No	BSL
100-41-4	Hexane	0.0021 J	0.0021 J	mg/kg	IP-33-10		0.0044	5.8			No	BSL
110-54-3	Isopropylbenzene	0.0014 BJ	0.0054 BJ	mg/kg	IP-38-14		0.0054	61			No	BSL
98-82-8	(Cumene)	0.0009 J	0.0009 J	mg/kg	IP-33-10		0.0044	190			No	BSL
179601-23-1	m,p-Xylenes	0.0039 J	0.0039 J	mg/kg	IP-33-10		0.0087	58			No	BSL
75-09-2	Methylene chloride	0.005 J	0.012 J	mg/kg	IP-38-14		0.012	35			No	BSL
104-51-8	n-Butylbenzene	0.0322	0.0322	mg/kg	IP-33-10		0.0322	390			No	BSL
103-65-1	n-Propylbenzene	0.0074	0.0074	mg/kg	IP-33-10		0.0074	380			No	BSL
95-47-6	o-Xylene	0.0014 J	0.0014 J	mg/kg	IP-33-10		0.0087	65			No	BSL
127-18-4	Tetrachloroethene	0.0007 J	0.0368	mg/kg	IP-28-15		0.0368	8.1			No	BSL
108-88-3	Toluene	0.0005 BJ	0.0005 BJ	mg/kg	IP-36-20.5		0.0044	490			No	BSL
156-60-5	trans-1,2-Dichloroethene	0.0015 J	0.0583	mg/kg	IP-36-20.5		0.0583	160			No	BSL
79-01-6	Trichloroethene	0.0009 J	0.0019	mg/kg	IP-28-15		0.0044	0.41			No	BSL
75-01-4	Vinyl chloride	0.0011 J	0.295	mg/kg	IP-36-20.5		0.295	0.059			Yes	ASL

TABLE 12: SUMMARY OF SUBSTATION GROUNDWATER DATA AND SELECTION OF COPCs AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Tap Water RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	November 2018 Vapor Intrusion Screening Level (VISL) (d)	Concentration Used for Screening Exceeds VISL?
	Volatile Organic Compounds											
75-35-4	1,1-Dichloroethene	0.0037 J	0.16 J	mg/L	MW-13-20180314	2.5	0.028	0.007	MCL	Yes ASL	0.257	Yes
67-64-1	Acetone	0.0051	0.007 J	mg/L	MW-40-20170907	12.5	1.4			Yes ASL	31000	No
156-59-2	cis-1,2-Dichloroethene	0.0015 J	88	mg/L	MW 41-20180314	88	0.0036	0.07	MCL	Yes ASL	NA	No
127-18-4	Tetrachloroethene	0.0016 J	0.519	mg/L	MW 41-20180606	2.5	0.0041	0.005	MCL	Yes ASL	0.0872	Yes
108-88-3	Toluene	0.0018 J	0.0018 J	mg/L	MW 14-20170905	2.5	0.11	1	MCL	Yes ASL	28.5	No
156-60-5	trans-1,2-Dichloroethene	0.0005 J	1.5 J	mg/L	MW 41-20180314	2.5	0.036	0.1	MCL	Yes ASL	NA	No
79-01-6	Trichloroethene	0.0002 J	0.36	mg/L	MW 41-20180606	2.5	0.00028	0.005	MCL	Yes ASL	0.00742	Yes
75-01-4	Vinyl chloride	0.0008 J	11.5	mg/L	MW 41-20171206	11.5	0.000019	0.002	MCL	Yes ASL	0.00178	Yes

TABLE 13: SUMMARY OF NORTH OF LEVEE GROUNDWATER DATA AND SELECTION OF COPCs
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

CAS No.	Parameter	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Detect	Concentration Used for Screening (a)	November 2018 Tap Water RSL (HI = 0.1, ELCR = 1e-06) (b)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Selected as a COPC? (c)	November 2018 Vapor Intrusion Screening Level (VISL) (d)	Concentration Used for Screening Exceeds VISL?
	Volatile Organic Compounds											
156-59-2	cis-1,2-Dichloroethene	0.0003 J	0.0142	mg/L	PZ-2-20180605	0.0142	0.0036	0.07	MCL	Yes ASL	NA	No
179601-23-1	m,p-Xylenes	0.0012 J	0.0012 J	mg/L	PZ-1-20170907 PZ-2-20170907	0.005	0.019	10	MCL	No BSL	0.6	No
127-18-4	Tetrachloroethene	0.0003 J	0.0003 J	mg/L	PZ-6-20180606	0.005	0.0041	0.005	MCL	Yes ASL	0.0872	No
108-88-3	Toluene	0.0011 J	0.0013 J	mg/L	PZ-11-20170906 PZ-11-20180605	0.005	0.11	1	MCL	No BSL	28.5	No
79-01-6	Trichloroethene	0.0002 J	0.0004 J	mg/L	PZ-12-20180605	0.005	0.00028	0.005	MCL	Yes ASL	0.00742	No
75-01-4	Vinyl chloride	0.0001 J	0.0006	mg/L	PZ-2-20180605	0.002	0.000019	0.002	MCL	Yes ASL	0.00178	Yes

TABLE 14: SELECTION OF EXPOSURE PATHWAYS AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI FILE NO. 130500

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
CURRENT	**Groundwater**	**North of Levee Groundwater**	North of Levee	Resident	Adult	Dermal	None	Although groundwater north of the levee is used as a source of drinking water for public water supply, no Site -related constituents have been detected in the City Wells since February 2016, and installation of private supply wells in the area north of the levee is prohibited by local ordinance. There are no occupied buildings in that area. Therefore, under current use conditions, there are no complete exposure pathways to off-site groundwater.
						Inhalation	None	
						Ingestion	None	
					Child	Dermal	None	
						Inhalation	None	
						Ingestion	None	
				C/I Worker	Adult	Dermal	None	
						Inhalation	None	
						Ingestion	None	
				Construction Worker	Adult	Dermal	None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
						Inhalation	None	
						Ingestion	None	
	Soil/ Groundwater	**Indoor Air**	Substation and North of Levee	Resident	Adult	Inhalation	None	There are no occupied structures at the Substation, and it is not anticipated that occupied structures will be built at the Substation in the future. The shortest distance between the leading edge of the plume and the nearest building is approximately 300 feet (building located to the north of Huster Road). Therefore, vapor intrusion of VOCs from site soil/groundwater to indoor air is not a current complete exposure pathway.
					Child	Inhalation	None	
				C/I Worker	Adult	Inhalation	None	
CURRENT/ FUTURE	**Soil**	**Soil 0 - 2 ft**	Substation and North of Levee	C/I Worker	Adult	Dermal	Quantitative	Commercial workers are assumed to contact surface soil during outdoor activities, while working at the property.
						Ingestion	Quantitative	
		Soil 0-23 ft	Substation and North of Levee	Construction Worker	Adult	Dermal	Quantitative	Construction/excavation workers are assumed to incidentally ingest and dermally contact surface and subsurface soil during redevelopment work.
						Ingestion	Quantitative	
		Air - Dust	Substation and North of Levee	C/I Worker	Adult	Inhalation	Quantitative	Windborne dust can be inhaled by persons at or down-wind of unvegetated soil.
				Construction Worker	Adult	Inhalation	Quantitative	Excavation activities could produce dust.
		Air - Vapors	Substation and North of Levee	C/I Worker	Adult	Inhalation	Quantitative	VOCs partitioned from soil to outdoor air as vapors can be inhaled by persons at or down-wind of unvegetated soil.
				Construction Worker	Adult	Inhalation	Quantitative	VOCs partitioned from soil to outdoor air as vapors could be produced during excavation activities.
	Soil/ Groundwater	**Surface Water**	Surface Water	Recreational Visitor	Adult	Dermal	None	Although groundwater that discharges to surface water can result in migration of constituents to surface water, the Site investigation activities have demonstrated that VOCs are not present in downgradient groundwater at locations near surface water bodies, indicating that surface water is not a receiving medium for this Site.
						Inhalation	None	
						Ingestion	None	
					Child	Dermal	None	
						Inhalation	None	
						Ingestion	None	
FUTURE	**Groundwater**	**Substation Groundwater**	Substation	Resident	Adult	Dermal	Quantitative	There are no current potential exposure pathways associated with groundwater beneath the substation. Although the substation will not be used for any purposes other than as a substation, potential exposure pathways associated with groundwater beneath the substation will be evaluated for future residential drinking water exposures.
						Inhalation	Quantitative	
						Ingestion	Quantitative	
					Child	Dermal	Quantitative	
						Inhalation	Quantitative	
						Ingestion	Quantitative	

				C/I Worker	Adult	Dermal Inhalation Ingestion	None None None	The residential scenario is protective for commercial workers; therefore, a commercial worker scenario is not quantitatively evaluated.
				Construction Worker	Adult	Dermal Inhalation Ingestion	None None None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
	Soil/ Groundwater	**Indoor Air**	Substation	Resident	Adult	Inhalation	Quantitative	The potential for vapor intrusion to be a complete pathway for future residential receptors if occupied buildings are constructed in the future is evaluated in the HHRA.
					Child	Inhalation	Quantitative	
				C/I Worker	Adult	Inhalation	None	The residential scenario is protective for commercial workers; therefore, a commercial worker scenario is not quantitatively evaluated.
	Groundwater	**North of Levee Groundwater**	North of Levee	Resident	Adult	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	Evaluation of groundwater as a future source of drinking water is based on analytical data for the core of the plume, which is located in the substation property.
					Child	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	
				C/I Worker	Adult	Dermal Inhalation Ingestion	Qualitative Qualitative Qualitative	
				Construction Worker	Adult	Dermal Inhalation Ingestion	None None None	Groundwater is located at a depth (ranging from 12-23 ft bgs) that is greater than depths that would realistically be encountered during excavation activities, therefore direct contact with groundwater is not a complete exposure pathway for a construction worker.
	Soil/ Groundwater	**Indoor Air**	North of Levee	Resident	Adult	Inhalation	None	Evaluation of groundwater as a future source of vapor intrusion is based on analytical data for the core of the plume, which is located in the substation property.
					Child	Inhalation	None	
				C/I Worker	Adult	Inhalation	None	

Notes:

bgs = below ground surface. C/I = Commercial/Industrial.

ft = feet.

HHRA = Human Health Risk Assessment.

VOCs = Volatile Organic Compounds.

TABLE 15: CANCER TOXICITY DATA -- INHALATION
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

Constituent of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation Cancer Slope Factor	
	Value	Units		Source(s)	Date(s)
1,1-Dichloroethene	ND		Inadequate data	IRIS	March 2019
1,2-Dichloroethene (cis)	ND		Inadequate data	IRIS	March 2019
1,2-Dichloroethene (trans)	ND		Inadequate data	IRIS	March 2019
Acetone	NA		Cannot be determined	IRIS	March 2019
Tetrachloroethene	2.6E-07	$(ug/m^3)^{-1}$	Likely to be carcinogenic in humans	IRIS	March 2019
Toluene	NA		D	IRIS	March 2019
Trichloroethene	4.1E-06	$(ug/m^3)^{-1}$	Carcinogenic to humans	IRIS	March 2019
Vinyl Chloride	4.4E-06	$(ug/m^3)^{-1}$	Known human carcinogen	IRIS	March 2019

Notes:
IRIS = USEPA Integrated Risk Information System. m^3 = cubic meter. ND = no data available. ug = microgram
USEPA = United States Environmental Protection Agency

TABLE 16: NON-CANCER TOXICITY DATA -- ORAL/DERMAL
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

Constituent of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency Factor for Dermal (1)	Adjusted Dermal RfD (2)		Primary Target Organ or System / Critical Effect	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
1,1-Dichloroethene	chronic	5.0E-02	mg/kg/day	100%	5.0E-02	mg/kg/day	Liver; fatty change	100/1	IRIS	March 2019
1,2-Dichloroethene (cis)	chronic	2.0E-03	mg/kg/day	100%	2.0E-03	mg/kg/day	Kidney; increased kidney weight	3,000	IRIS	March 2019
1,2-Dichloroethene) (trans	chronic	2.0E-02	mg/kg/day	100%	2.0E-02	mg/kg/day	Immunological; decreased antibody forming cells	3,000	IRIS	March 2019
Acetone	chronic	9.0E-01	mg/kg/day	100%	9.0E-01	mg/kg/day	Kidney; nephropathy	1,000/1	IRIS	March 2019
Tetrachloroethene	chronic	6.0E-03	mg/kg/day	100%	6.0E-03	mg/kg/day	CNS; neurotoxicity	100	IRIS	March 2019
Toluene	chronic	8.0E-02	mg/kg/day	100%	8.0E-02	mg/kg/day	Kidney; increased kidney weight	1,000/1	IRIS	March 2019
Trichloroethene	chronic	5.0E-04	mg/kg/day	100%	5.0E-04	mg/kg/day	Developmental; Immunological	10 to 1000	IRIS	March 2019
Vinyl Chloride	chronic	3.0E-03	mg/kg/day	100%	3.0E-03	mg/kg/day	Liver; liver cell polymorphism	30/1	IRIS	March 2019

Notes:

(1) Values obtained from RAGS Volume 1 (Part E, Supplemental Guidance for Dermal Risk Assessment, Interim Guidance, USEPA, 2004). Per this guidance, a value of 100% is used for analytes without published values

(2) Adjusted Dermal RfD = Oral RfD x Oral Absorption Efficiency Factor for Dermal. Per RAGS Part E (USEPA, 2004), adjustments are only performed for chemicals that have an oral absorption efficiency of less than 50%.

chronic = chronic RfDs apply to exposure durations longer than seven years; the chronic value is used as the subchronic RfD if a subchronic RfD is not available. CNS = central nervous system. kg = kilogram.

TABLE 17: NON-CANCER TOXICITY DATA -- INHALATION
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

Constituent of Potential Concern	Chronic/ Subchronic	Inhalation RfC (1)		Primary Target Organ or System / Critical Effect	Combined Uncertainty/Modifying Factors	RfC: Target Organ(s)	
		Value	Units			Source(s)	Date(s)
1,1-Dichloroethene	chronic	2.0E-01	mg/m^3	Liver; fatty change	30/1	IRIS	March 2019
1,2-Dichloroethene (cis)	chronic	ND				IRIS	March 2019
1,2-Dichloroethene (trans)	chronic	ND				IRIS	March 2019
Acetone	chronic	3.1E+01	mg/m3	CNS	100	MRL	March 2019
Tetrachloroethene	chronic	4.0E-02	mg/m^3	CNS; neurotoxicity	100	IRIS	March 2019
Toluene	chronic	5.0E+00	mg/m3	CNS; neurotoxicity	100	IRIS	March 2019
Trichloroethene	chronic	2.0E-03	mg/m^3	Developmental; Immunological	10 to 1000	IRIS	March 2019
Vinyl Chloride	chronic	1.0E-01	mg/m^3	Liver; liver cell polymorphism	30/1	IRIS	March 2019

Notes:
CNS = central nervous system.
chronic = chronic RfDs apply to exposure durations greater than 7 years; the chronic value is used as the subchronic RfD if a subchronic RfD is not available IRIS = USEPA Integrated Risk Information System. m^3 = cubic meter. mg = milligram.
MRL = Minimum Risk Level (ATSDR: chronic MRLs). ND = no data available.
RfC = reference concentration.

TABLE 18: SITE RISK TO ORGANS
AMEREN MISSOURI HUSTER SUBSTATION
ST. CHARLES, MISSOURI

FILE NO. 130500		Exposure Medium	
		Substation Groundwater	
POTENTIAL RECEPTOR/	EXPOSURE ROUTE AND	HAZARD	
USE SCENARIO	MIGRATION PATHWAY	INDEX	ELCR
Future Resident (Adult and Child)	Ingestion	825	2.E-01
	Dermal Contact	88	2.E-02
	Ambient Vapor Inhalation	37	1.E-02
	Total	950	2.E-01
		Target Organ	Hazard Quotient
	1,1-Dichloroethene	Liver	0.24
	Acetone	Kidney	0.0005
	1,2-Dichloroethene (cis)	Kidney	824
	1,2-Dichloroethene (trans)	Immune system	1.7
	Tetrachloroethylene	Nervous System	1.9
	Toluene	Kidney	0.002
	Trichloroethene	Developmental; Immune system	20.74
	Vinyl Chloride	Liver	102
	Sum: Liver		102
	Sum: Kidney Sum: Immune System		824
			22.5
	Sum: Nervous System		1.9
	Sum: Developmental		20.7

Notes:
Risk calculations are provided in Attachment D.
ELCR = Excess Lifetime Cancer Risk.
1. Hazard index is based on child receptor and is calculated as the hazards for child exposure to groundwater. Cancer risk is the sum of risks for child exposure to groundwater and adult exposure to groundwater.

Table 19

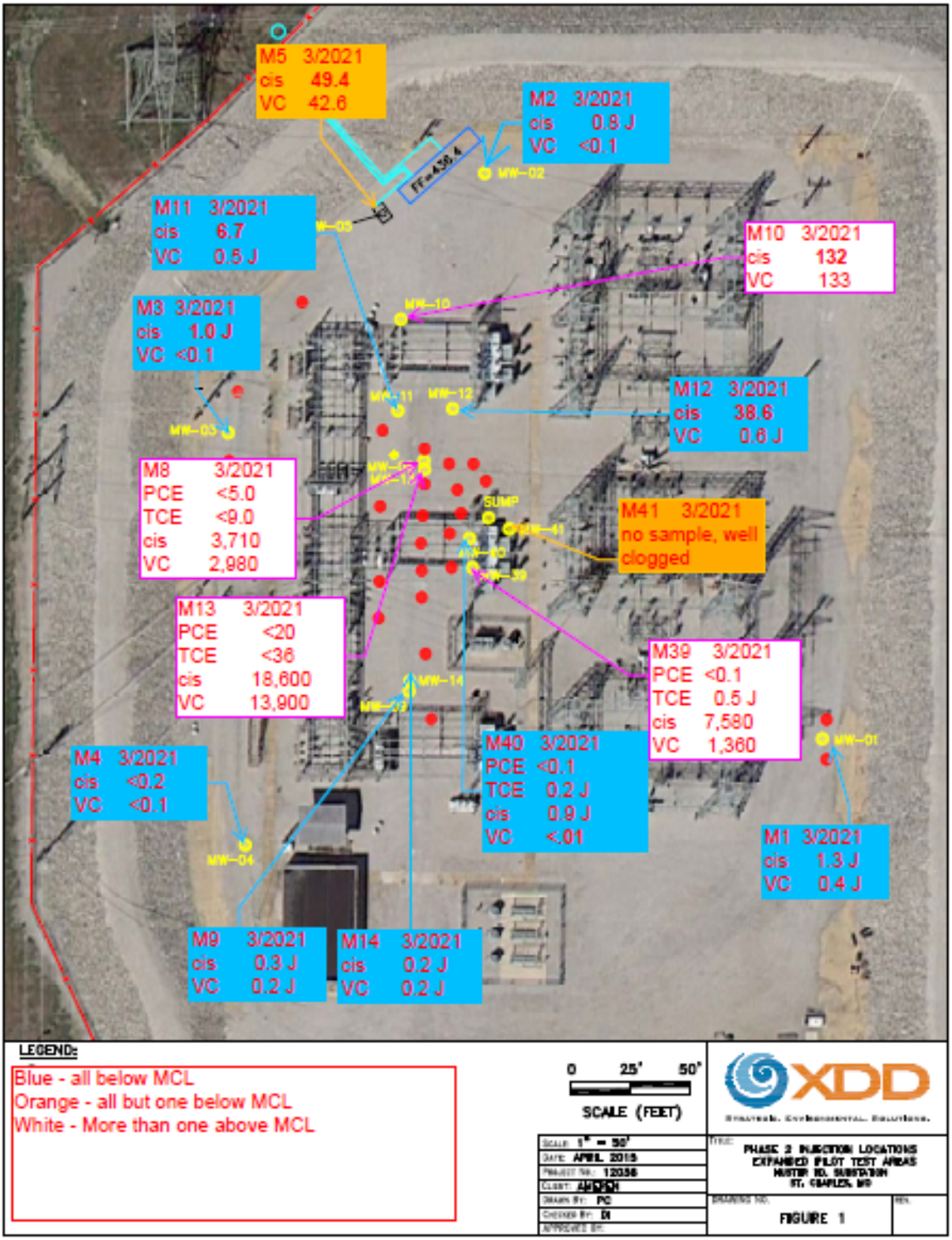
TABLE A: STATE CHEMICAL-SPECIFIC REQUIREMENTS				
Contaminants	Maximum Concentration Allowed	Medium	Reason Why Requirement is an ARAR	Regulatory Citation
cis-1,2-DCE Tetrachloroethene Trichloroethene Vinyl Chloride	Federal MCLs	Drinking Water	Provides regulations and MCLs for public water supplies. State MCLs are equivalent to Federal MCLs	10 CSR 60-4.010
cis-1,2-DCE Tetrachloroethene Trichloroethene Vinyl Chloride	Federal MCLs	Surface Water and Groundwater	This rule sets forth limits for substances that might become discharged to various waters of the state.	10 CSR 20-7.015
cis-1,2-DCE Tetrachloroethene Trichloroethene Vinyl Chloride	Federal RSLs	Soils	This tool is based on Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals) (RAGs Part B) and Soil Screening Guidance: User's Guide (PDF) (89 pp), Technical Background Document (PDF) (447 pp) and Supplemental Guidance (PDF) (187 pp). RAGs Part B provides guidance on using EPA toxicity values and exposure information to calculate risk-based Screening Levels.	EPA/540/R-96/018 July 1996
cis-1,2-DCE Tetrachloroethene Trichloroethene Vinyl Chloride	EPA Action Levels	Air	Provides definitions and reference tables for hazardous substances located at the site.	10 CSR-6.020 https://www.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf

TABLE B: STATE LOCATION-SPECIFIC REQUIREMENTS			
Location Subject to Requirement	Requirement	Reason Why Requirement is an ARAR	Regulatory Citation
Applicable areas within or near site area.	Wildlife Code of Missouri	3-CSR 10-4.110 is the rule that prohibits the pursuit, . taking possession, or any use of wildlife except as provided in the codes. 3-CSR 10-4.111 is the rule that extends special protection to endangered wildlife and lists those species considered to be threatened with extinction. The Missouri Department of Conservation has guidance on how to handle these circumstances.	3-CSR 10-4.110 and 3-CSR 10-4.111

TABLE C: STATE ACTION-SPECIFIC REQUIREMENTS			
Action Subject to Requirement	Requirement	Reason Why Requirement is an ARAR	Regulatory Citation
Applicable to RI/FS for the Groundwater Containment System (GCS)	Water Pollution Control Regulations	Applies to all discharges to waters of the state for protection of the designated uses.	10 CSR 20-2 through 20-9
Applicable to RI/FS	Well Construction Rules	Sets forth rules and requirements	10 CSR 23-3 and 23-4

Table 20 – Pre-Pilot Study Groundwater Results

Table 21 – Post-Pilot Study Groundwater Results



APPENDIX B

FIGURES

Figure 1 – Findett Site

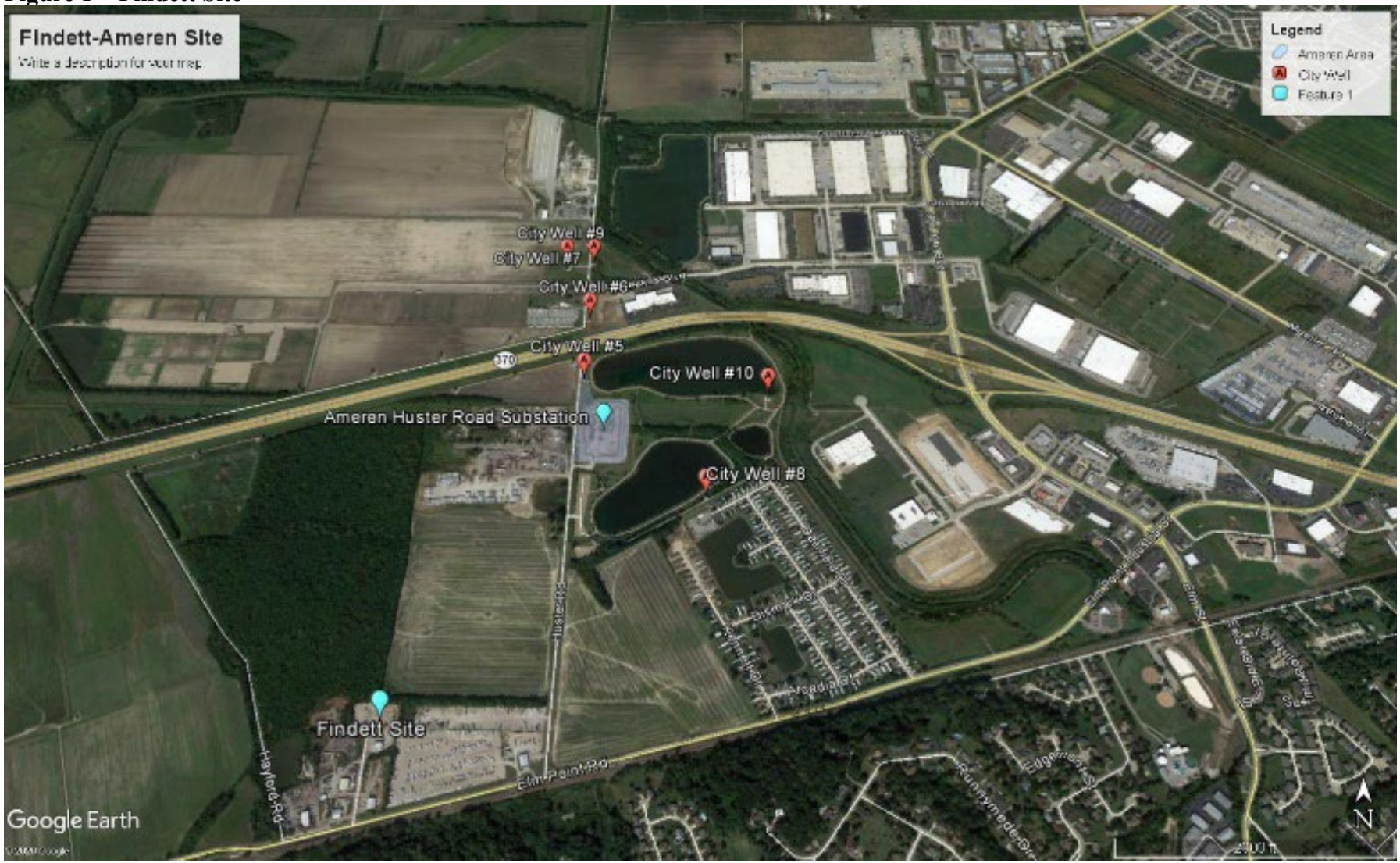


Figure 2 – Ameren Substation

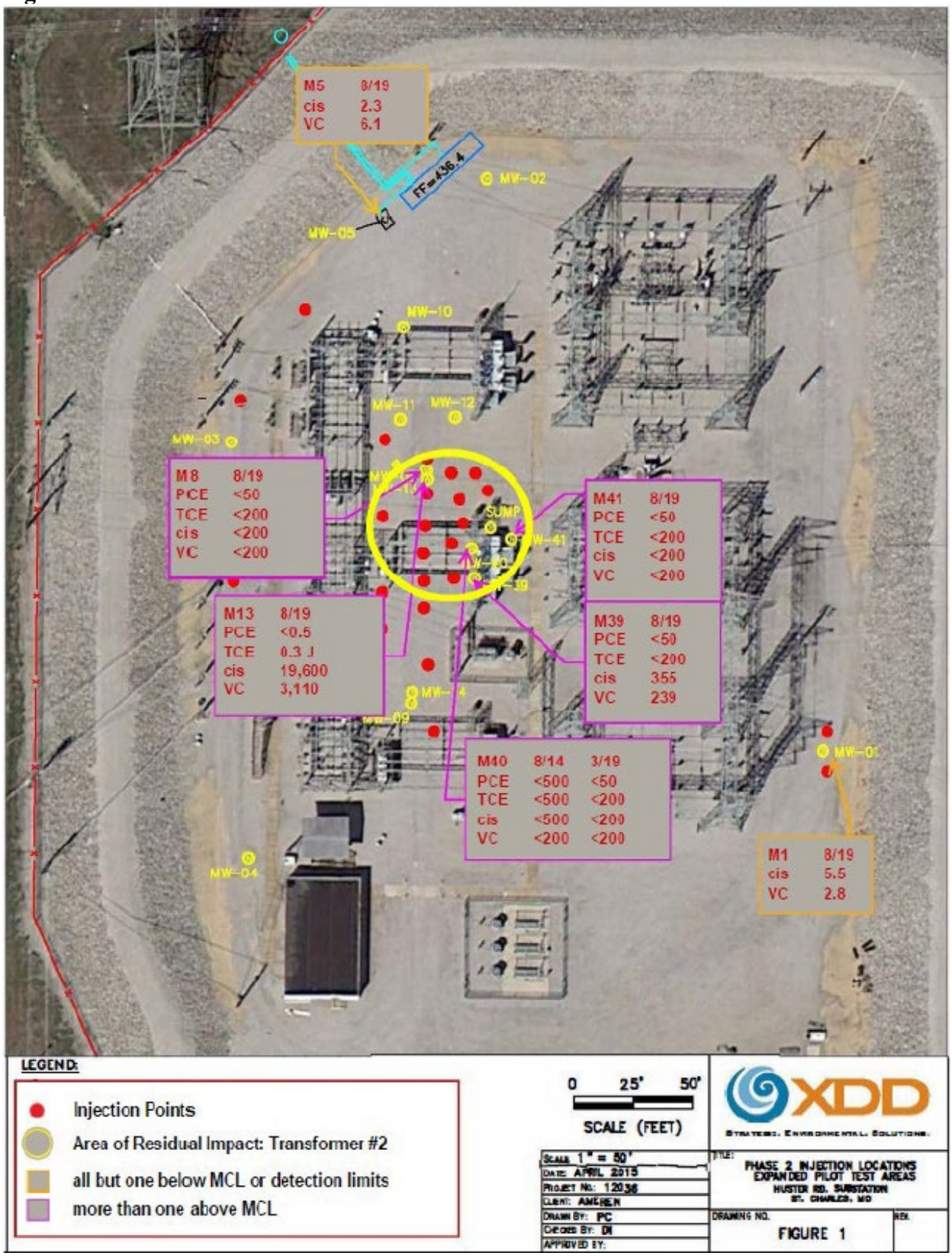


Figure 3 - Off-site – DCE Contour Plume Lines

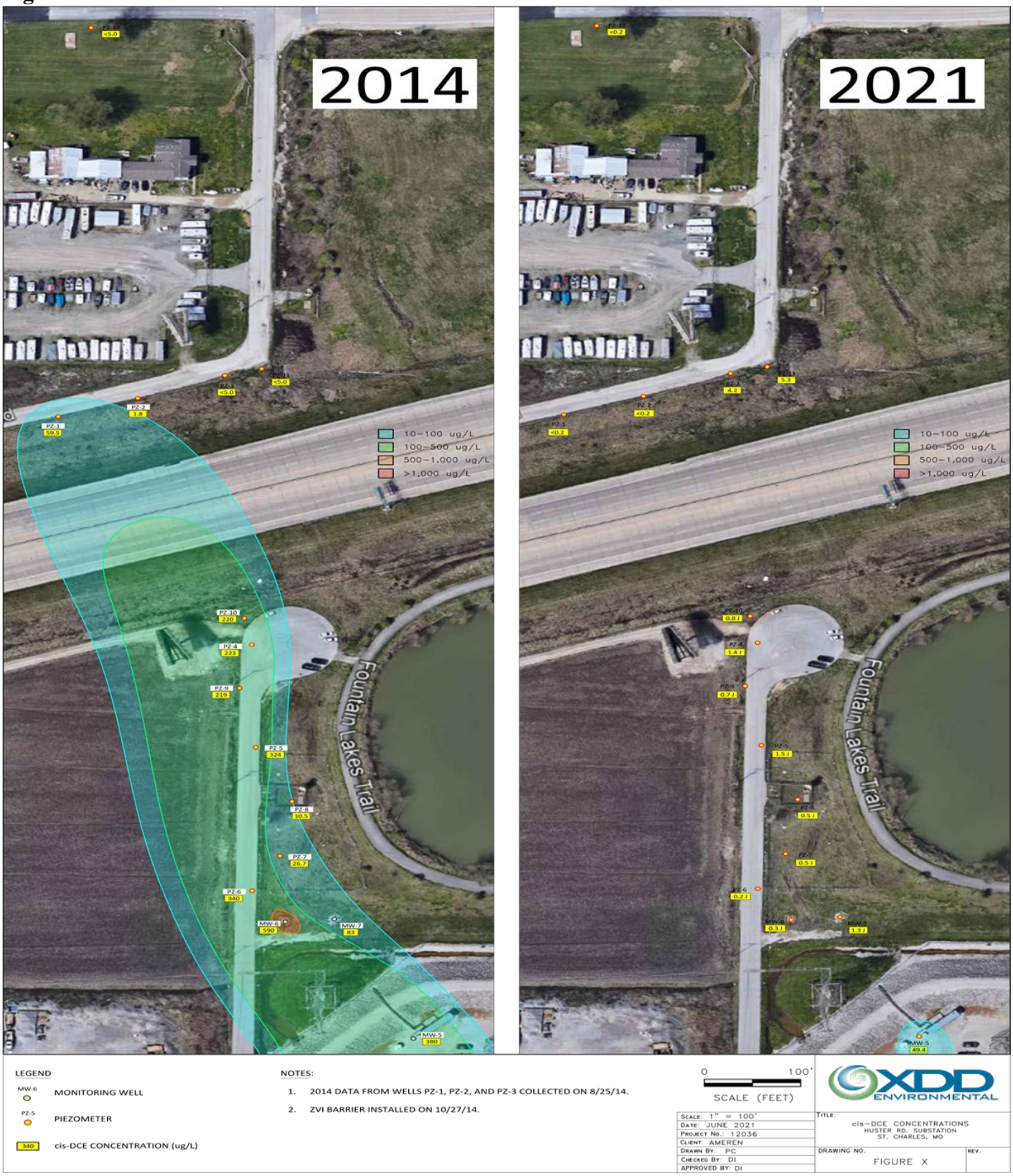


Figure 4 - Off-site – VC Contour Plume Lines

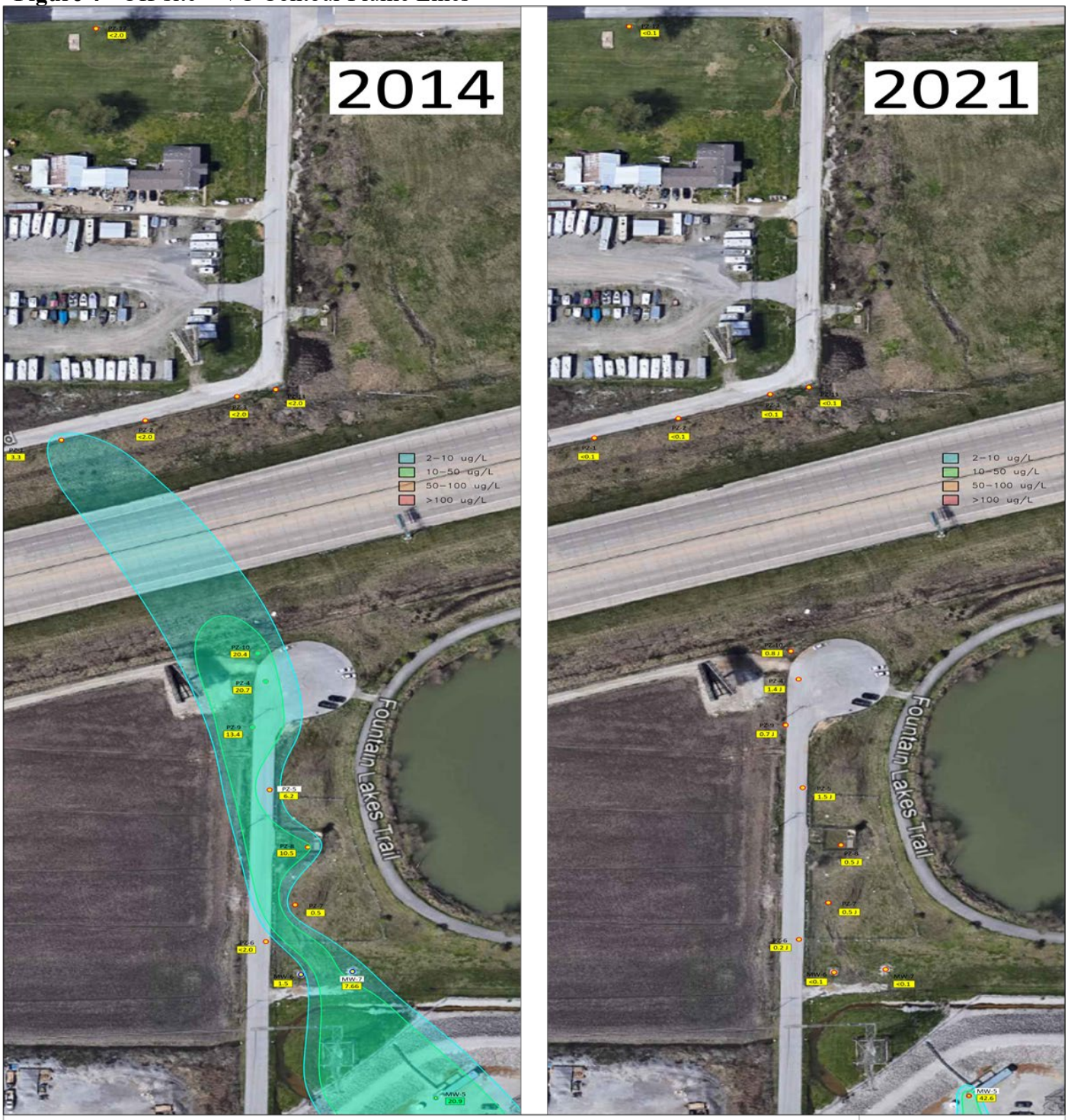
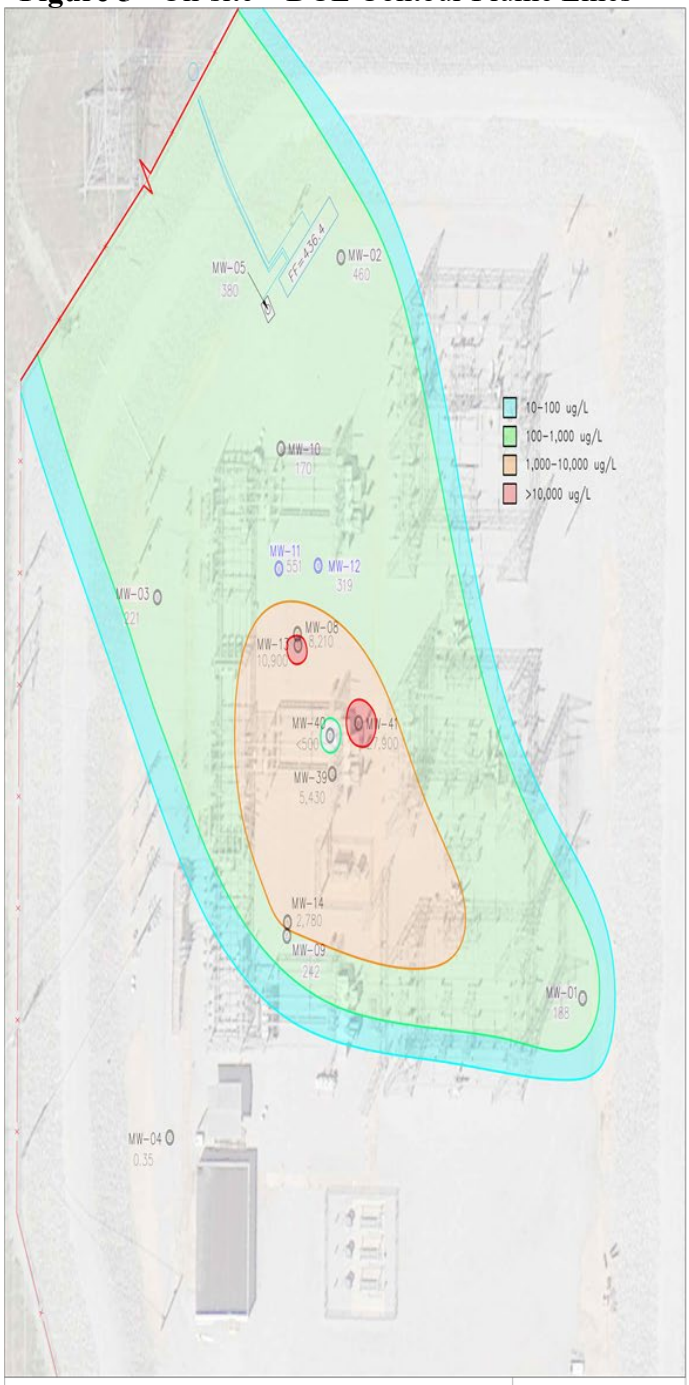
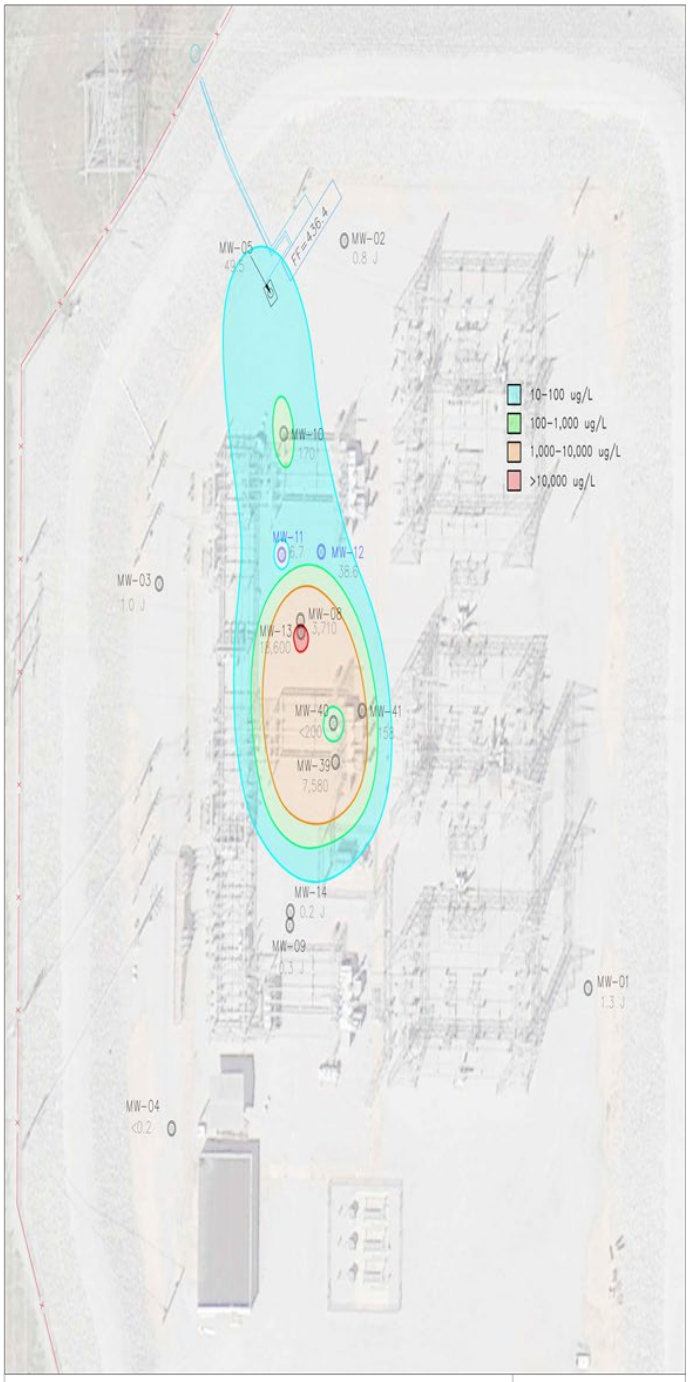


Figure 5 - On-site – DCE Contour Plume Lines





LEGEND:

MW-04 MONITORING WELL

MW-39, MW-40, MW-41 SCREENED IN COHESIVE UNIT ABOVE SAND AQUIFER (MW-41 MW-41 HAS NOT RECENTLY BEEN SAMPLED DUE TO ISSUE. MAINTENANCE HAS BEEN COMPLETED AND SAMPLING IS ANTICIPATED TO BE RESUMED IN JUNE 2021)

MW-12 EXISITING BIOAUGMENTATION INJECTION LOCATION

0 75'

SCALE (FEET)

XDD ENVIRONMENTAL

SCALE: 1" = 75'	TITLE: 2014 cis-DCE CONCENTRATIONS HUSTER RD. SUBSTATION ST. CHARLES, MO
DATE: JUNE 2021	
PROJECT No.: 12036	
CLIENT: AMEREN	
DRAWN BY: PC	DRAWING NO. FIGURE X
CHECKED BY: DI	REV.
APPROVED BY: DI	

LEGEND:

MW-04 MONITORING WELL

MW-39, MW-40, MW-41 SCREENED IN COHESIVE UNIT ABOVE SAND AQUIFER (MW-41 MW-41 HAS NOT RECENTLY BEEN SAMPLED DUE TO ISSUE. MAINTENANCE HAS BEEN COMPLETED AND SAMPLING IS ANTICIPATED TO BE RESUMED IN JUNE 2021)

MW-12 EXISITING BIOAUGMENTATION INJECTION LOCATION

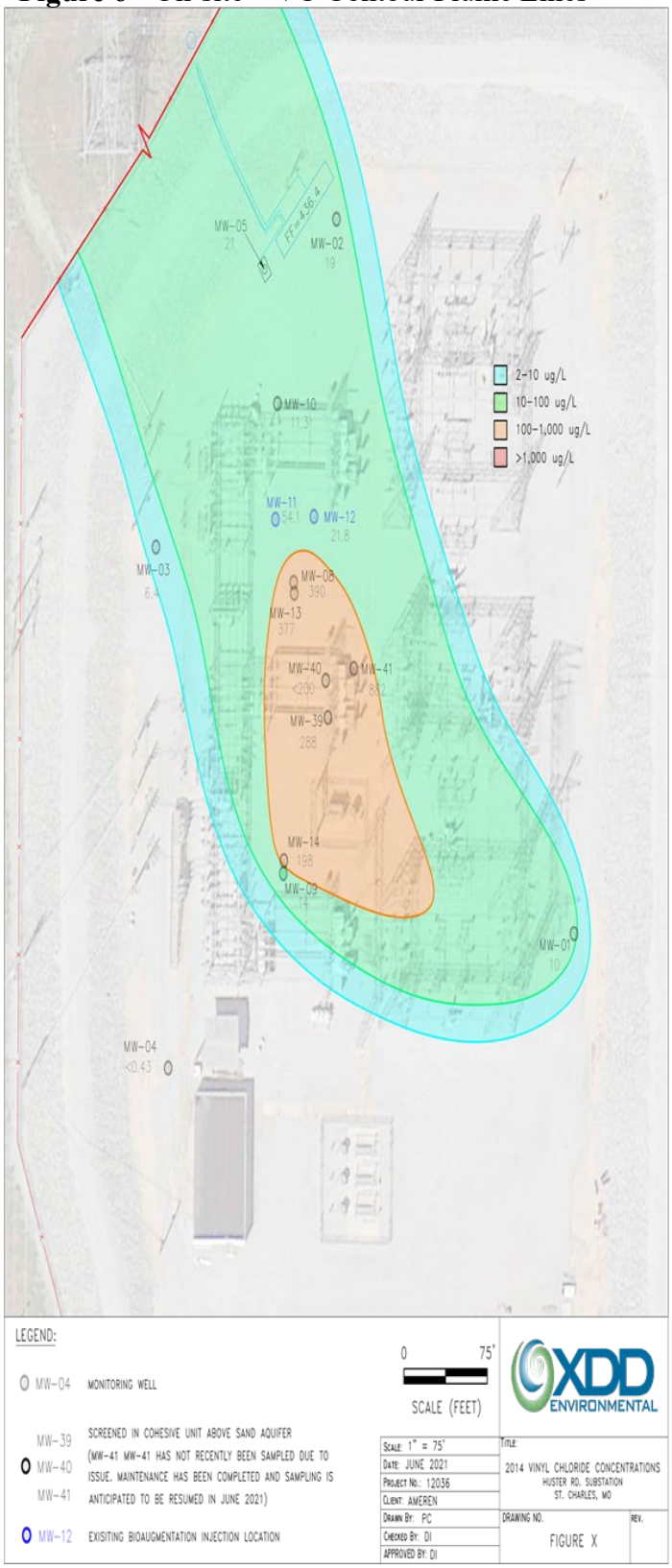
0 75'

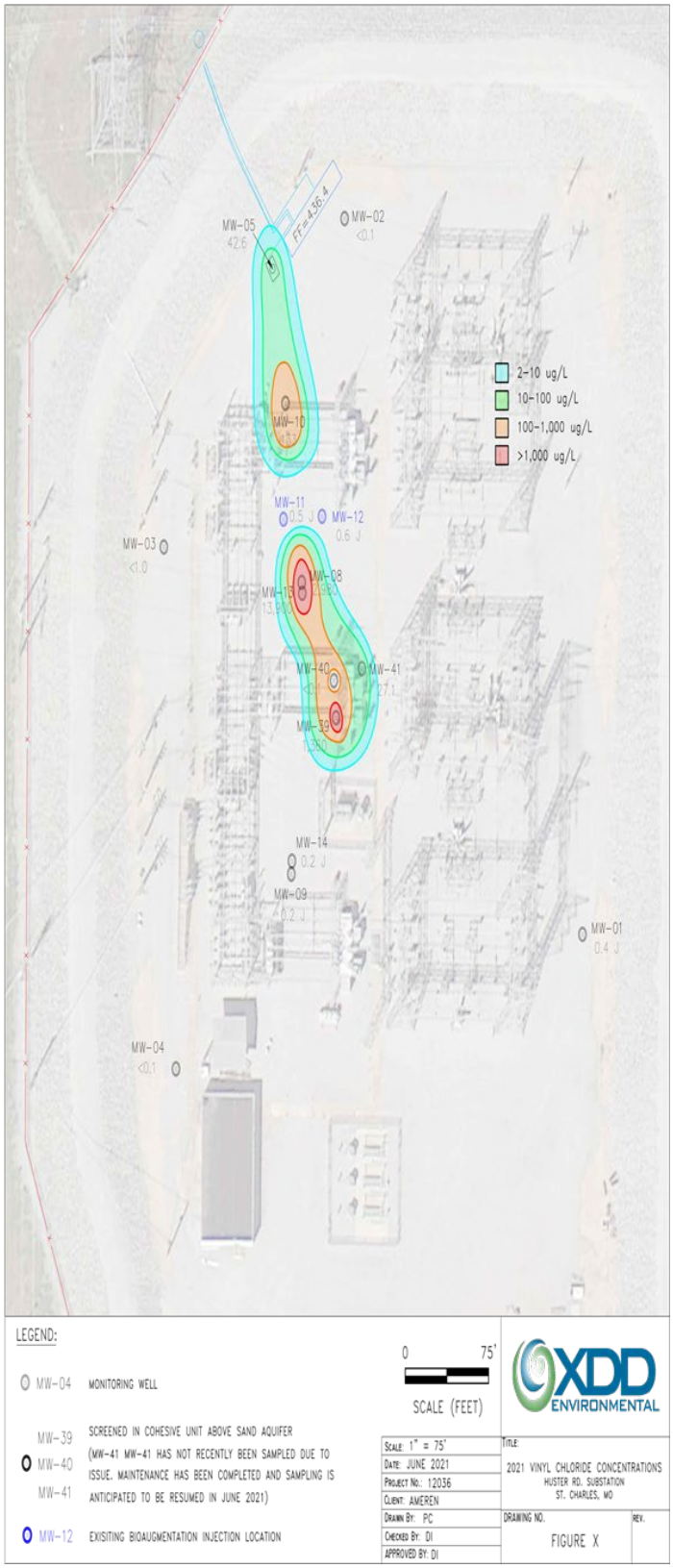
SCALE (FEET)

XDD ENVIRONMENTAL

SCALE: 1" = 75'	TITLE: 2021 cis-DCE CONCENTRATIONS HUSTER RD. SUBSTATION ST. CHARLES, MO
DATE: JUNE 2021	
PROJECT No.: 12036	
CLIENT: AMEREN	
DRAWN BY: PC	DRAWING NO. FIGURE X
CHECKED BY: DI	REV.
APPROVED BY: DI	

Figure 6 - On-site – VC Contour Plume Lines





APPENDIX C

RESPONSIVENESS SUMMARY

Findett OU4 Huster Road Substation Proposed Plan
Responsiveness Summary
February 9, 2021

Commenter 1 (email received 2/23/21)
John M. Phillips
Utilities Superintendent
City of St. Charles - Public Works Dept.

Dear Mr. Sperry:

Below are comments on the Proposed Plan for clean-up and monitoring of the above referenced site.

1. Add monitoring wells between the sites and City Wells No. 8 and No. 10. The original investigation mentions that there were not enough monitoring wells to the east to characterize flow in that direction.
2. Contaminates north of the substation continue to persist and put City Wells No. 6, No. 7 and No. 9 at risk. Enhancement of the extraction rate or a new extraction well further north are needed to protect the City wells.
3. Continue remediation efforts and monitor the hardware to ensure proper operation. In-situ treatment should not be ruled out given the persistence of contamination north of the substation.
4. Contamination is anything foreign to the groundwater resource, not just MCL exceedances. Remediation needs to continue until contamination approaches the detection limits, not just to MCL levels. The responsible parties should be held accountable for any level of contamination in the water supply serving the citizens of Saint Charles.
5. Responsible parties should provide an additional City Wells. The City of St. Charles Board of Public Works decided to keep City Well No. 4 and No. 5 off-line due to the presence of contamination previously within but currently adjacent to the wells. Only real time monitoring or constant testing could prevent the contamination from entering the drinking water distribution system and the consuming customers. Quarterly or monthly testing could only notify the utility that they have in fact pumped contaminated water and distributed it without knowledge. We cannot in good conscience undertake this risk regardless of the EPA's assertions that being below MCL currently means there is no risk.
6. We recommend that the site be added to the NPL.
7. The EPA's FINDING OF FACT regarding the Hayford Bridge Road Site in the Administrative Settlement Agreement And Order On Consent For Emergency Response Action (USEPA REGION VII CERCLA -07-2012-0025) stated as a fact that the City of St. Charles Public Drinking Water Wells are endangered and steps needed to protect the PWS were outlined in the Action Memorandum dated June 25, 2012; which states:

"The purpose of this Action Memorandum is to request and document approval of the proposed time-critical removal action for the Findett Corp. site, also known as the Hayford Bridge Road Groundwater site (the Site), located in the city of St Charles (City), St. Charles County, Missouri. The general objective of the action is to prevent the contamination of the City's drinking water supply with volatile organic compounds (VOCs) from the Site. This will be achieved by expansion of the existing Elm Point Wellfield (EPW) to replace existing contaminated and threatened public water supply (PWS) wells, installation and operation of a Temporary Containment Well (TCW), preparation of a drinking

water treatment plant contingency Air Stripper Design (ASD) and additional groundwater and soil investigative work. The U.S. Environmental Protection Agency (EPA) anticipates that the potentially responsible parties (PRPs) will conduct the removal action."

The first remedial action listed (underlined for emphasis) was the "expansion of the existing Elm Point Wellfield (EPW) to replace existing contaminated and threatened public water supply (PWS) wells". Now the EPA has gone back on its previously stated fact that the PWS is threatened and the appropriate action needed to mitigate this risk is the expansion of the Elm Point Wellfield away from the contamination plume. The EPA further expressed this concern by stating that "Site conditions meet the criteria for response action under 40 CFR 300.415(b)(2) of the National Contingency Plan (NCP) under the following criteria: Actual or potential contamination of drinking water supplies or sensitive ecosystems [40CFR 300.415(b)(2)(ii)]"

Furthermore, the Section "IV. Endangerment Determination" states that, "Actual or threatened releases of hazardous substances from this Site may present an imminent and substantial endangerment to public health, or welfare, or the environment based on the presence of VOCs in the aquifer of the municipal drinking water wellfield at levels exceeding remedial action levels/state standards and on the consistent occurrence of VOCs in municipal PWS drinking water wells above detection limits.

The City of St Charles Public Water System should be made whole by expanding the Elm Point Wellfield to replace the vertical drinking water wells which have been impacted and/or threatened by the encroaching contamination as a way to mitigate the risk to the public drinking water system and protect the public health. The party which released the contamination into the environment should be responsible for any and all costs associated with the expansion of the wellfield to remove it from the threat of the contamination plume which they created. This was EPA's previous stance as stated in the previously mentioned Action Memorandum as follows:
"The EPW will be expanded to the north and new wells will be installed to replace W5, W6 and W8. The new wells may be either two or three new vertical wells or a new radial/collector well connected to the City's raw water collection system for delivery to the Elm Point Water Treatment Plant. The revised and updated groundwater modeling will be calibrated based on the best technical information concerning aquifer characteristics, pumping effects, etc. The design and construction schedule for the new PWS wells will provide for the new wells to be in service as soon as practical. The wellfield expansion will be funded by the PRPs and will be conducted either as a '"turnkey" PRP project or will be implemented through the City's acquisition, construction and operation processes."

Sincerely,

John M. Phillips
Utilities Superintendent
City of St. Charles - Public Works Dept.
2871 Elm Point Industrial Dr.
St. Charles, MO 63301

EPA Response

Mr. Phillips,

The EPA appreciates you providing comments on the Findett OU4 Proposed Plan on behalf of the City of St. Charles – Public Works Department. The EPA met with representatives of the City in 2014 to discuss whether Ameren should install additional municipal wells. We have also discussed this subject multiple times since then with City representatives by phone during our quarterly calls. The EPA does not agree that current data indicates Ameren should install additional wells. Current data shows that the groundwater plume is fully contained within the Substation and that degradation of the contaminant plume is occurring. We appreciate the City's stance on not wanting any detections of chloro-ethenes (PCE, TCE, *cis*-1,2-DCE, and VC) in its public drinking water, but the Safe Drinking Water Act Maximum Contaminant Levels (SWDA MCLs), which are applicable requirements for this Superfund Site, were promulgated to assure the public that contaminants below these levels are safe.

The EPA understands that the City has a legitimate interest in making sure that the proposed remedy will have no negative economic consequences for operation of the City's Public Water Supply System and pose no public health risks. To support the City in these efforts the EPA provides the City with quarterly updates on groundwater monitoring and remedial actions taken at the Site. It is EPA's intention to be fully protective of public health while implementing this remedy and has set a cleanup objective for the remedy to restore groundwater to its beneficial use as a source of drinking water. As of this time, all groundwater exceeding MCLs are fully contained within the Substation and groundwater north of the Substation has not had an exceedance of any MCL since 2016; see well results below for *cis*-1,2-DCE (primary contaminant):

Well Number	Below MCL	Below 5 ug/L	Non-Detect
1	Since 9/14		
2	Since 11/15		Since 8/19
3	Since 11/14		Since 5/15
4	Since 8/15	Since 12/19	
5	Since 8/16	Since 12/18	
6	Since 5/14		Since 3/18
7	Since 10/14		Since 7/16
8	Since 5/15		Since 12/17
9	Since 4/16	Since 12/17	Since 8/19
10	Since 11/15	Since 7/16	Since 12/19
11		Since 12/14	
12			Since 12/14

The comment to add additional monitoring wells was discussed on the January and April 2021 quarterly calls between Ameren, the EPA, state, and City. It was agreed on the last call that Ameren would update its Conceptual Site Model (CSM). Ameren stated that they would provide the group with a Draft CSM by the July 2021 quarterly call. Further consideration of the need for additional wells will be dependent upon the results from the updated CSM.

The City also requested that the Site be added to the National Priorities List (NPL). The EPA will continue to discuss the listing of the Site, but no decisions regarding this matter has been made at this time.

The EPA did not make any changes were made to the Selected Remedy as a result of the comments in Mr. Phillips' letter.

Commenter 2 (email received 2/25/21)

Cory Rackley
Sewer Maintenance Supervisor
City of Saint Charles
Department of Public Works

Dear Mr. Sperry:

Below are comments on the Proposed Plan for clean-up and monitoring of the above referenced site.

1. Add monitoring wells between the contamination sites and City Wells No. 8 and No. 10. The original investigation mentions that there were not enough monitoring wells to the east to characterize flow in that direction.
2. Contaminates north of the substation continue to persist and put City Wells No. 6, No. 7 and No. 9 at risk. Enhancement of the extraction rate or a new extraction well further north are needed to protect the City Wells.
3. Continue remediation efforts and monitor the hardware to ensure proper operation. In-situ treatment should not be ruled out given the persistence of contamination north of the substation, including underneath 370.
4. Contamination is anything foreign to the groundwater resource, not just MCL exceedances. Remediation needs to continue until contamination approaches the detection limits, not just to MCL levels. The responsible parties should be held accountable for any level of contamination in the water supply serving the citizens of Saint Charles.
5. Proposed plan should require responsible parties to provide additional City Wells to replace the currently threatened and damaged Wells. The City Wells No. 4 and No. 5 are off -line due to the presence of contamination previously detected and due to the extremely close proximity to the contamination source. Only real time monitoring or constant testing could prevent the contamination from entering the drinking water distribution system and the consuming customers. Quarterly or monthly testing could only notify the utility that they have in fact pumped contaminated water and distributed it without knowledge.
6. We recommend that the site be added to the EPA National Priorities List.

Cory Rackley
Sewer Maintenance Supervisor
City of Saint Charles
Department of Public Works
2871 Elm Point Industrial Dr.
St. Charles, Mo 63301

EPA Response

The EPA appreciates you providing comments on the Findett OU4 Proposed Plan on behalf of the City of St. Charles – Public Works Department. The comments in your letter are a subset of the comments submitted by Mr. Phillips. Please refer to EPA's response to Mr. Phillips' comments.

The EPA did not make any changes were made to the Selected Remedy as a result of the comments in Mr. Rackley's letter.

APPENDIX D

MISSOURI DEPARTMENT OF NATURAL RESOURCES CONCURRENCE LETTER TO PROPOSED PLAN

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

January 12, 2021

Mary Peterson, Director
Superfund & Emergency Management Division
U.S. EPA, Region VII
11201Renner Blvd.
Lenexa, KS 66219

Dear Mary Peterson:

The Missouri Department of Natural Resources' Division of Environmental Quality has reviewed the Proposed Plan, Findett/Hayford Bridge Road site, Ameren Missouri Huster Road Substation Operable Unit 4 (OU4), St. Charles, MO 63303, dated December 2020, as prepared by the U.S. Environmental Protection Agency (EPA), Region VII. The Department concurs with the EPA's Preferred Alternative (Alternative 3) - Enhanced In-Situ Bioaugmentation Attenuation, Groundwater Extraction and Treatment System (in standby mode), and institutional controls. The Department understands that Ameren Missouri, the potentially responsible party, is expected to continue funding and implementing response actions at OU4.

Thank you for the opportunity to participate in the review process to choose a remedy for OU4 of the Findett/Hayford Bridge Road site. If additional or unanticipated issues come to light during the public comment period and completion of the Record of Decision (ROD), the Department reserves the right to provide additional input that may affect the outcome of the ROD.

If you have any questions or comments, please contact me at 573-751-0763, or you may contact the Superfund Section Chief, Valerie Wilder, at P.O. Box 176, Jefferson City, MO 65102-0176, by phone at 573-751-7880, or by email to Valerie.Wilder@dnr.mo.gov.
Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Ed Galbraith

Edward B. Galbraith
Director